THE WAR MUNITIONS ACT. *See p.* 21.
TWO NEW LIGHTSHIPS FOR THE HUMBER CONSERVANCY BOARD (Drawings). *See p.* 31.

SHIPBUILDING AND SHIPPING RECORD. *July* 8, 1915.
REGISTERED AT THE G.P.O. AS A NEWSPAPER.

SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

Physical & Applied Sci Serials

LONDON: Queen Anne's Chambers, S.W.
GLASGOW: 37, Union Street.
NEWCASTLE: 12, Grey Street.

THURSDAY, JULY 8, 1915.

Price Sixpence Weekly.
Prepaid Subscription for 12 months:—
Inland, £1 5s 0d.; Abroad, £1 12s. 0d.

DICK'S PATENT **EXTRUDED METALS:** BRONZE, BRASS, YELLOW METAL, NAVAL BRASS, COPPER, DELTA METALS.
Sole Manufacturers:
The Delta Metal Co., Ltd., East Greenwich, London, S.E.

THE **YORKSHIRE COPPER WORKS, LTD.,** LEEDS. **TUBES** BRASS and COPPER.
"BEMAL" BRASS CONDENSER TUBES.

HARRISONS (LONDON) LTD.,
BUNKER CONTRACTORS TO THE BRITISH ADMIRALTY
:: :: :: AND LEADING STEAMSHIP LINES. :: :: ::
LONDON BUNKERING A SPECIALITY.
Head Office: 66, Mark Lane, London, E.C.

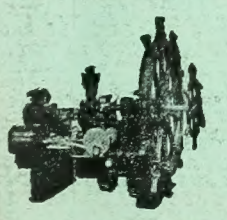
C. E. HEINKE & CO.,
DIVING APPARATUS.
87, GRANGE ROAD,
Telegrams—"Heindig, London." BERMONDSEY, LONDON.

JOHN LEVICK,
METAL SPINNING WORKS,
ALMA STREET, ASTON, BIRMINGHAM.
PATENTEE AND MANUFACTURER OF
Folding and Fixed Lavatory Basins, Baths, Commodes, etc., for Railway Carriages, Ships' Berths, etc., etc.

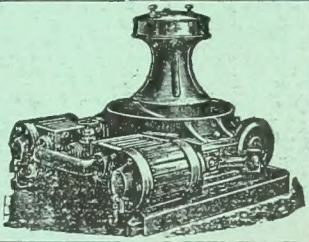
HIGGINSON'S
CARGO-BLOCKS
7,
HURST STREET, LIVERPOOL.

THE SUNDERLAND FORGE & ENGINEERING Co., LTD.,
SUNDERLAND.
ELECTRIC LIGHT & POWER FOR SHIPS. - - ELECTRIC WINCHES.

ELECTRIC LIGHT AND POWER FOR SHIPS.
Generators, Motors for Forced Draught and Ventilating Fans, Winches, Ash Hoists, &c.
H. T. BOOTHROYD LTD., BOOTLE, LIVERPOOL.
Telegrams: "COMMUTATOR LIVERPOOL." Telephone: 420 Bootle.



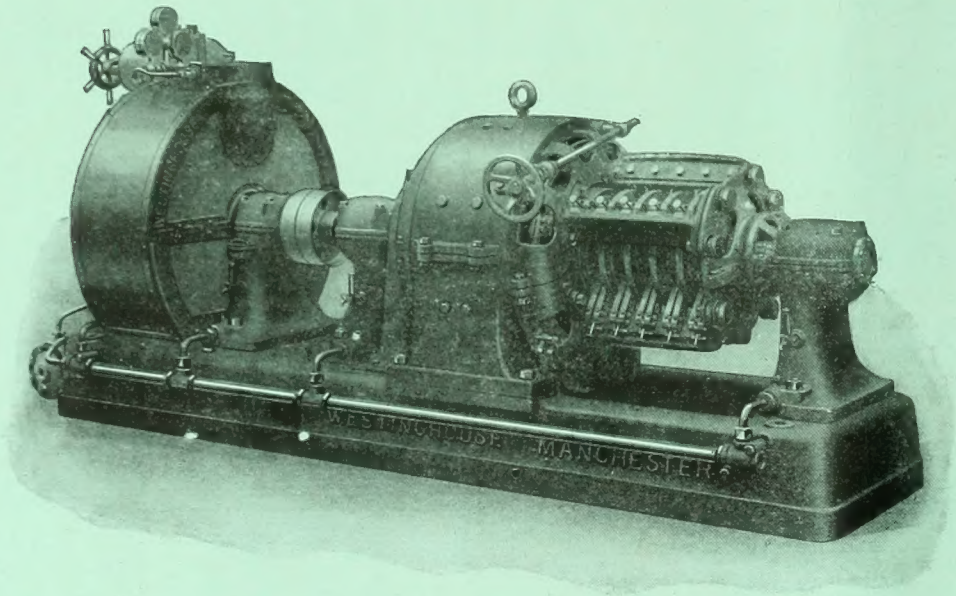
JOHN CHAMBERS, Ltd.
ENGINEERS. ~ MAKERS OF ~ SHIPBUILDERS.
Steering Gears and Capstans.
WORKS: OULTON BROAD, Nr. LOWESTOFT.



Alphabetical Index of Advertisers, Page 24. 2 w. Classified Index to Advertisements, Page 19.

The British Westinghouse Electric and Mfg. Co., Ltd.

Westinghouse
Radial Commutator
Turbo-Generator Sets
for Ships



The Westinghouse Radial Commutator makes possible the use of carbon brushes without incurring the difficulties met with in using high speed cylindrical commutators.

The radial face of the commutator slides easily across the face of the brush and, as cross axial movements do not tend to make the brushes "chatter," there is no fear of sparking and the consequent damage to both brush and commutator. The only movements at right angles to the radial faces are caused by the floating of the armature in its bearings, these being slow the brush can easily follow them and be constantly in contact with the commutator surface.

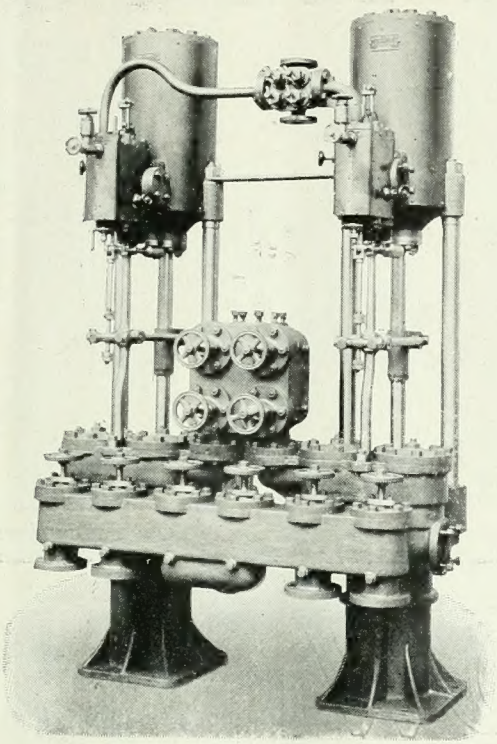
Made in sizes from 25 to 500 kw. Smaller sizes are built with cylindrical commutators, as this construction is quite suitable where the armatures and commutators are small and light and the current small.

Our accumulated knowledge and experience of these problems is always at your service.

Westinghouse
Manchester

Trafford Park | Manchester

SAY YOU SAW IT IN THE "S. & S. R."



HALL PUMPS

FOR

MARINE INSTALLATIONS.

MAKERS OF

FEED PUMPS and HEATERS,

AIR PUMPS,

OIL FUEL, LUBRICATION and CARGO OIL PUMPS,

SERVICE PUMPS.

CONTRACTORS TO THE BRITISH AND FOREIGN ADMIRALTIES.

J. P. HALL & SONS, Ltd.,

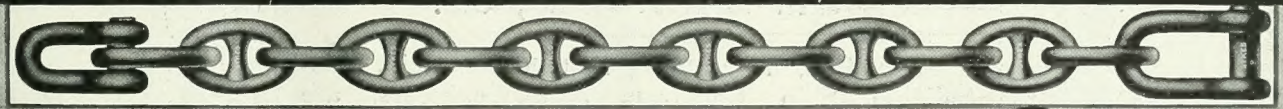
PETERBOROUGH.

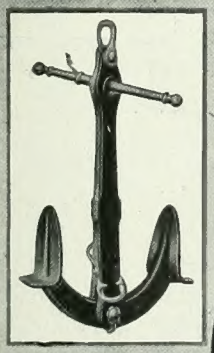
RICHARD SYKES & SON LTD

TELEGRAPHIC ADDRESS: "SYKES CRADLEY HEATH"

CRADLEY HEATH, STAFFORDSHIRE.

CODE: A.B.C. 5th EDITION. TELEPHONE: No. 6, CRADLEY.



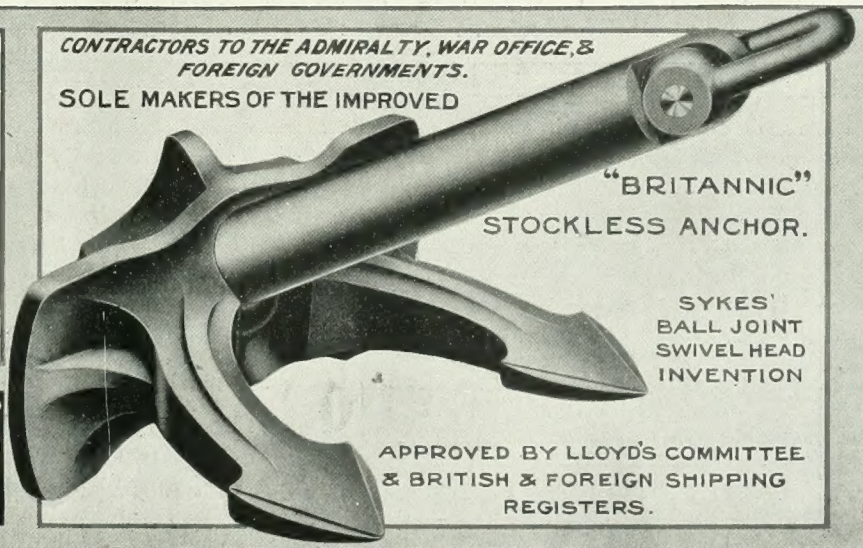


CONTRACTORS TO THE ADMIRALTY, WAR OFFICE, & FOREIGN GOVERNMENTS.

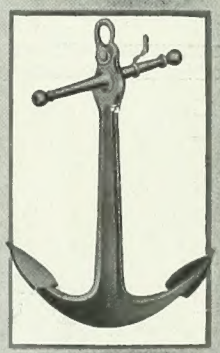
SOLE MAKERS OF THE IMPROVED

"BRITANNIC" STOCKLESS ANCHOR.

SYKES' BALL JOINT SWIVEL HEAD INVENTION



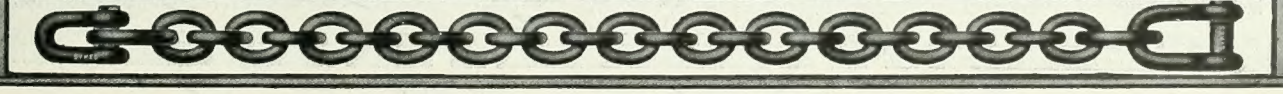
APPROVED BY LLOYD'S COMMITTEE & BRITISH & FOREIGN SHIPPING REGISTERS.



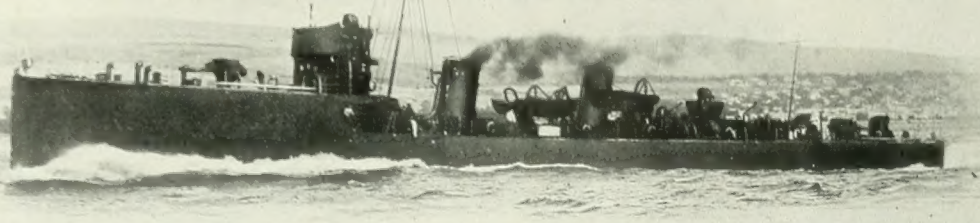
CABLES & ANCHORS TO ENGLISH LLOYDS. BRITISH CORPORATION GERMAN LLOYDS & BUREAU VERITAS REQUIREMENTS.

ALL WEIGHTS AND SIZES IN STOCK.

CRANE, INCLINE, HAULING & SLING CHAINS.



TORPEDO-BOAT DESTROYER "LURCHER"
Designed and Constructed by YARROW & Co. LTD., GLASGOW,
for the BRITISH NAVY.



The above vessel represents an important advance in Destroyer Construction
Length, 255 ft., Beam, 25 ft. 7 in., Mean speed during 8 hours official trial, 35·34 knots.
This vessel is propelled by turbines driving twin screws, and is fitted with the latest
YARROW PATENT OIL BURNING BOILERS.

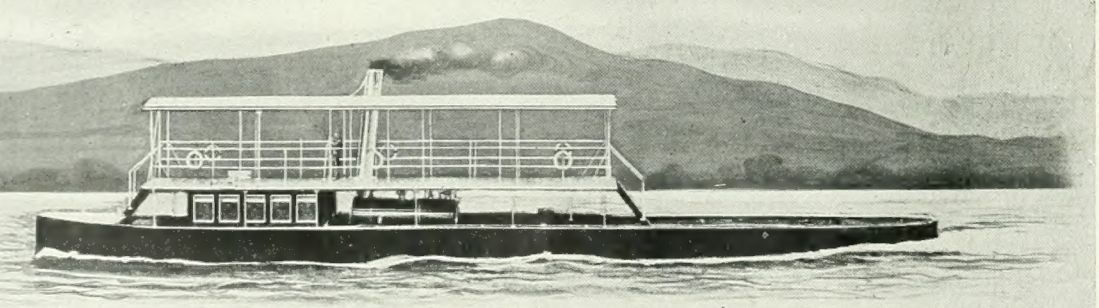
YARROW & CO. LTD., GLASGOW.

BUILDERS OF TORPEDO BOATS, DESTROYERS.

HIGH SPEED SHALLOW DRAUGHT STEAMERS and LAUNCHES, etc.

Yarrows Ltd., of Victoria, British Columbia, Shipbuilders, Ship Repairers and Engineers, are associated with Messrs. Yarrow & Co., Ltd., Glasgow.

SHALLOW-DRAUGHT LAUNCH, "YARROW SYSTEM."



Length, 75 ft., Beam, 9 ft. 3 in., Draught 12 in., Speed 10 Miles an hour.
Messrs YARROW make a speciality of SHALLOW-DRAUGHT RIVER STEAMERS, either propelled by a STERN WHEEL or by SCREWS WORKING IN TUNNELS, fitted with YARROW'S PATENT HINGED FLAP, *driven by Steam or Internal Combustion Engines.*

JOHN BROWN & Co LTD

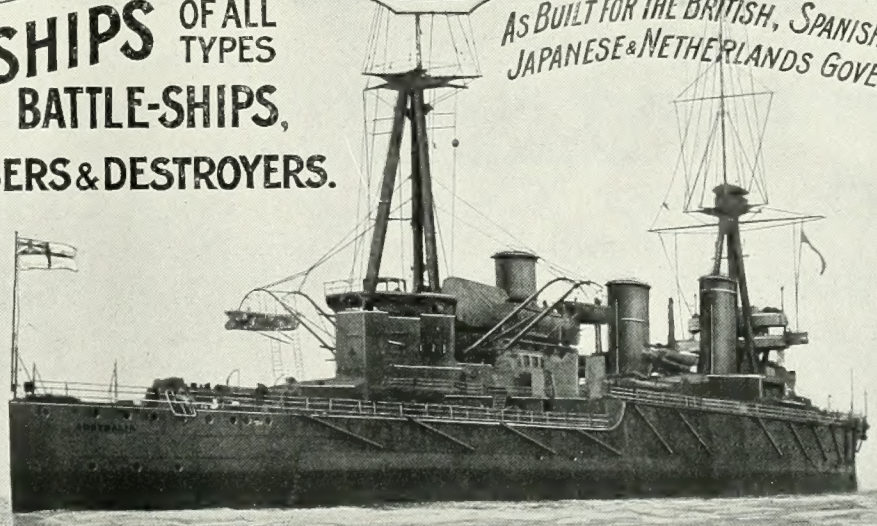
BUILDERS OF PASSENGER AND CARGO STEAMERS

MANUFACTURERS OF ARMOUR PLATES Gun Forgings OF ALL DESCRIPTIONS

HOLLOW ROLLED TURBINE DRUMS LARGEST SIZES OF CRANK AND STRAIGHT SHAFTING

WARSHIPS OF ALL TYPES BATTLE-SHIPS, CRUISERS & DESTROYERS.

AS BUILT FOR THE BRITISH, SPANISH, RUSSIAN, JAPANESE & NETHERLANDS GOVERNMENTS.



BOILER FLUES & OTHER MARINE SPECIALITIES.

RAILWAY MATERIAL, TOOL STEELS OF ALL KINDS.

ATLAS WORKS, SHEFFIELD, & CLYDEBANK, NEAR GLASGOW.

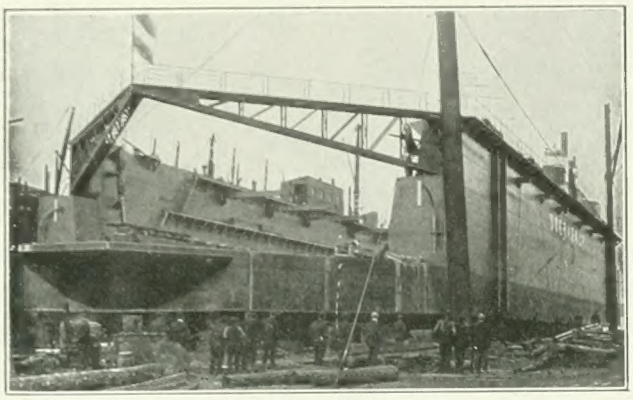
LONDON OFFICE – 8, THE SANCTUARY, WESTMINSTER. S.W.

WILLIAM HAMILTON & CO., LTD.,

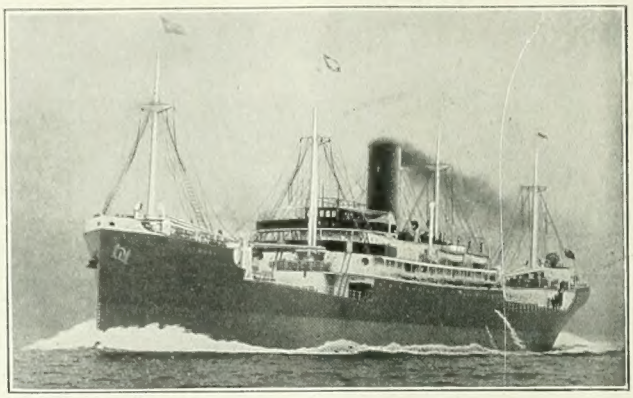
Shipbuilders,

Port Glasgow, SCOTLAND.

BUILDERS OF PASSENGER AND CARGO VESSELS, FLOATING DOCKS, PONTOONS, etc.



Floating Dock for Soerabaya, Java.



Passenger and Cargo Steamer "Colusa."

NINE BUILDING BERTHS. LENGTH FOR VESSELS UP TO 850 FEET.

CONTRACTORS TO THE BRITISH ADMIRALTY.

TELEGRAMS: "HAMILTON, PORT GLASGOW." TELEPHONE: 23, PORT GLASGOW.

LEOPOLD WALFORD & Co.

LONDON: 29, Gt. St. Helens, E.C. SHIP & INSURANCE BROKERS. PARIS: Rue de Seze 6.

FREIGHT CONTRACTORS.

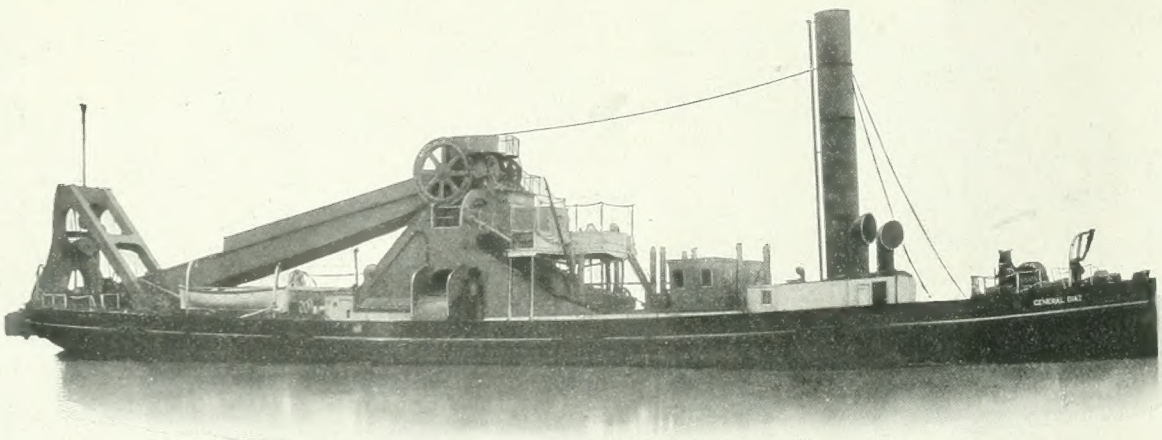
Specialists for the Transport of

HEAVY AND BULKY MACHINERY

by specially constructed Steamers.

CONTRACTORS FOR DELIVERY OF SHIPS ABROAD.

——— CRUISERS, DESTROYERS, SUBMARINES, STEAMERS, Etc. ———



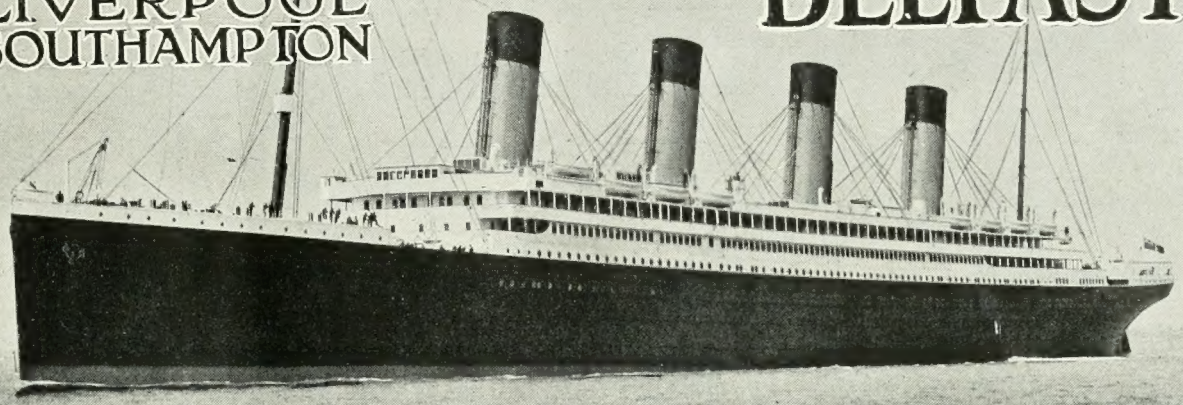
DREDGER "GENERAL DIAZ," delivered from LONDON to ST. JOHN, N.B.

SAY YOU SAW IT IN THE "S. & S. R."

HARLAND & WOLFF, LTD.

GLASGOW
LIVERPOOL
SOUTHAMPTON

BELFAST

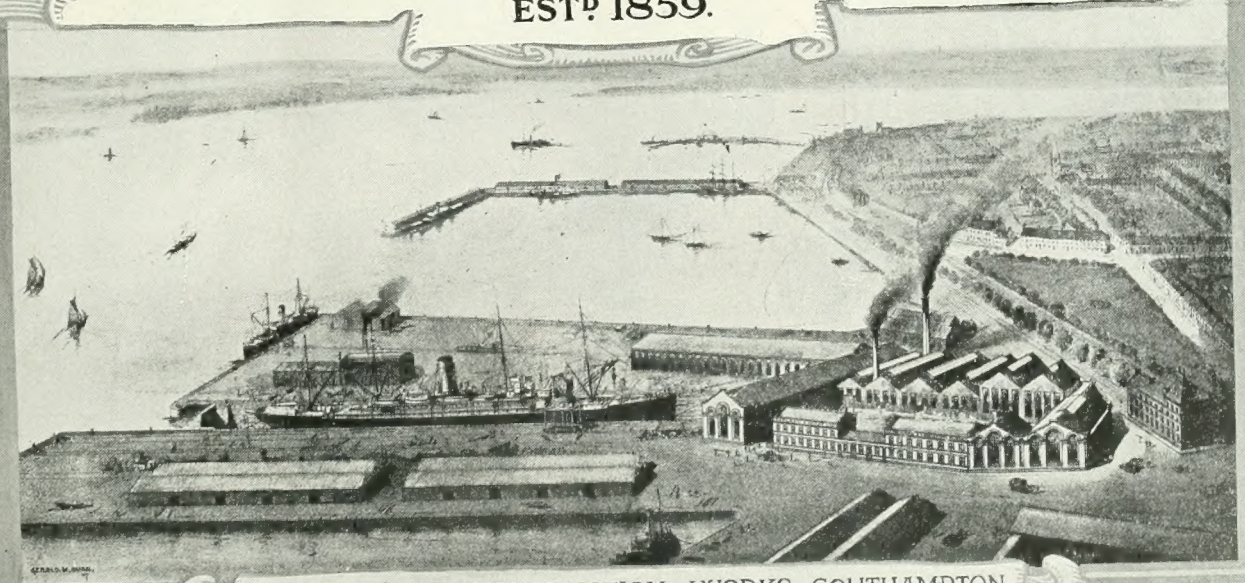


SHIPBUILDERS & MARINE ENGINEERS

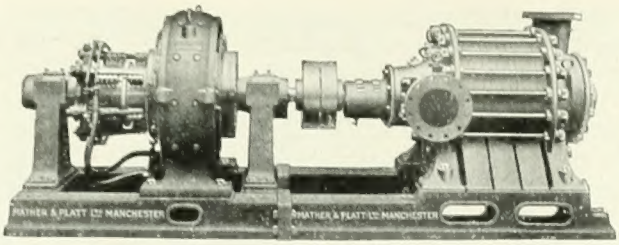
Repairs & Reconstructions
of every description,

FULLY EQUIPPED DRY DOCKS *and* REPAIR WORKS
at
LIVERPOOL &
SOUTHAMPTON.

ESTD 1859.



REPAIRING & RECONSTRUCTION WORKS, SOUTHAMPTON.



No internal joints between pressure stages.

■ ■ ■

No unbalanced thrust.

TURBINE PUMPS
For High Lifts.

Special Features:

Absence of Thrust Bearings.
Automatic Differential Hydraulic Balance.
High Efficiency. Low First Cost. Accessibility.
Small Floor Space.

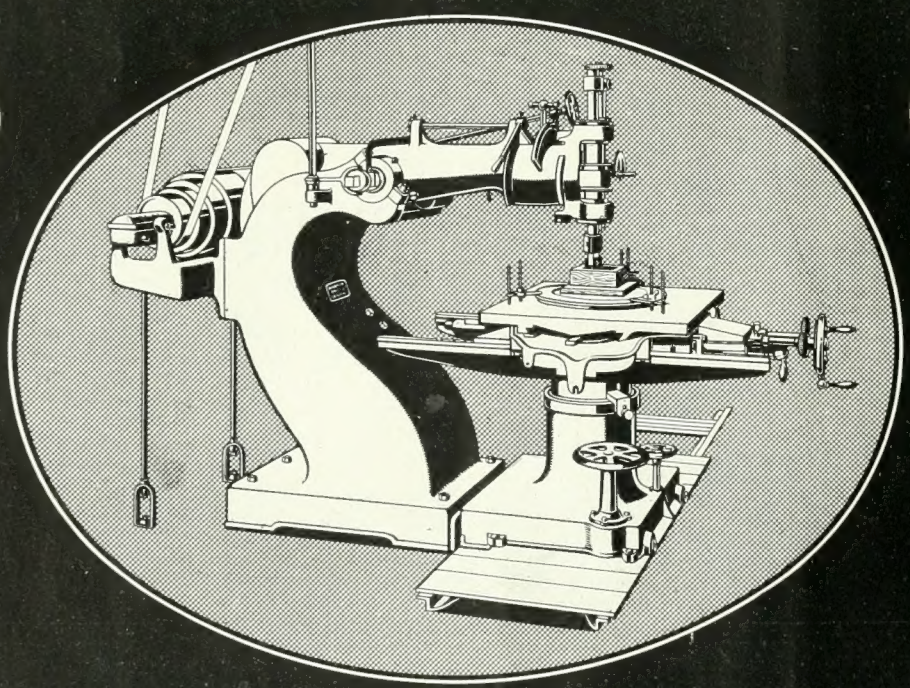
Mather & Platt, Ltd.
MANCHESTER and LONDON.

No stuffing boxes under high pressure.

■ ■ ■

No possible chance of rust preventing dismantling.

The New Mechanical Woodworker W.W.
Specially designed for Engineers, Shipyard & Railway Works.



Wadkin & Co. Woodworking Machine Tool Makers **Leicester Eng.**

SWAN, HUNTER, AND WIGHAM RICHARDSON LTD

WALKER and WALLSEND-ON-TYNE

Also at SOUTHWICK, SUNDERLAND.

Builders and Repairers of
SHIPS : ENGINES
FLOATING DOCKS, etc.

NEPTUNE-DIESEL MARINE OIL ENGINES

DIESEL ENGINES FOR SUBMARINES

Glass roofed berths enabling ships to be built under cover.

Graving docks 560 & 490 ft. long — Two floating docks.

SAY YOU SAW IT IN THE "S. & S. R."

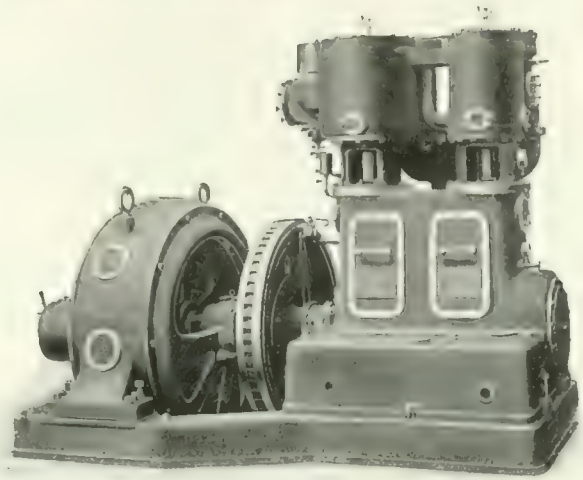
SELF-LUBRICATING

AIR & GAS COMPRESSORS

STEAM ENGINES & TURBINES.

ADVANTAGES:

DURABILITY.
STEADY RUNNING.
PROVED ECONOMY.
BEST WORKMANSHIP.
HIGHEST REPUTATION.
LOW STEAM CONSUMPTION.



ADVANTAGES:

LOW COST.
RELIABILITY.
HIGH EFFICIENCY.
GOOD GOVERNING.
SMALL FLOOR SPACE.
MINIMUM ATTENTION.

Motor-Driven Compressor, 1,600 cu. ft. capacity.

Estab. 1852.

London Office: 8, Victoria Street, S.W.

BELLISS & MORCOM LTD.

BIRMINGHAM.

Telegrams: "Belliss, Birmingham."

GRAHAM'S

PATENT LOUD-SPEAKING NAVAL TELEPHONES

ADOPTED BY THE BRITISH ADMIRALTY, FOREIGN GOVERNMENTS AND THE LEADING STEAMSHIP COMPANIES.

The Telephone Without Equal for Every Class of Naval Construction.

Graham's Instruments are Original Models Designed and Manufactured by Specialists.

ALFRED GRAHAM & COMPANY,

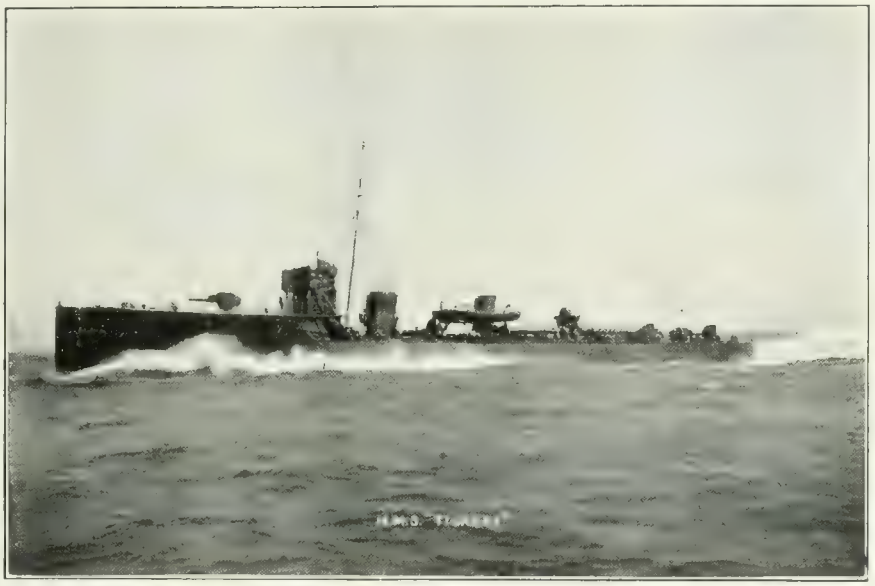
ST. ANDREW'S WORKS, CROFTON PARK,

TELEGRAMS "NAVALHADA, BROCK, LONDON."

LONDON, S.E.

TELEPHONE: SYDENHAM, NO. 952.

R. & W. HAWTHORN,



SHIPBUILDERS

ENGINEERS

RECIPROCATING ENGINES.
TURBINE ENGINES.
LOCOMOTIVES.

FORGE MASTERS

DOCK OWNERS

BOILER MAKERS

CYLINDRICAL TYPE.
LOCOMOTIVE TYPE.
YARROW TYPE.
BABCOCK TYPE,
etc., etc.

LESLIE &

SHIPYARD:
HEBBURN-ON-TYNE.

ENGINE WORKS:
ST. PETER'S, NEWCASTLE.

LOCOMOTIVE WORKS:
FORTH BANKS, NEWCASTLE.

DOCK AND FORGE:
HEBBURN-ON-TYNE.

LONDON OFFICE:
EXCHANGE CHAMBERS,
ST. MARY AXE, E.C.
AGENT: J. W. McCULLOCH.

FORGE AGENT:
R. S. ROWELL,
QUEEN STREET, NEWCASTLE.

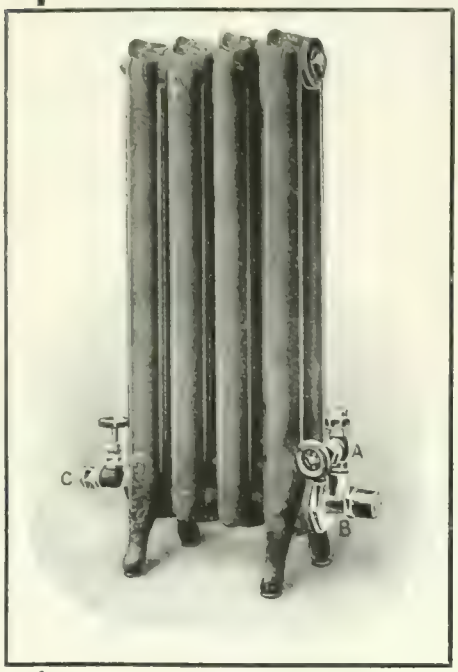
COMPANY, LTD.

ARCHIBALD LOW & SONS,

ENGINEERS, LTD.

PARTICK, GLASGOW.

Established over 60 years.



Heating Specialists and Patentees of the

"HIGHLOW" VACUUM HEATING SYSTEM.

RECENTLY FITTED IN T.S.S. "TUSCANIA."

Noiseless circulation — No smell from Radiators — Great economy in steam.

Low's Patent "Unifix" Metal to Metal connections fitted throughout. No leaking joints.

LIVERPOOL AGENTS:
A. J. NEVILL & CO.,
9, Cook Street.

LONDON OFFICE:
31, Budge Row,
Cannon Street, E.C.

HULL AGENTS:
OHLSON SHIP SALE & SURVEYING AGENCY,
Castle Street.

W. S. LAYCOCK, Ltd., —Victoria Works,— Millhouses, SHEFFIELD.

Telephone 4117 (2 lines). Telegraphic Address: "Invention, Sheffield."

PATENT SELF-BALANCING FRAMELESS SASH

. . FOR . .

Promenade Decks of Steamships and other purposes.

Very simple mechanism, easily regulated and Windows are easily movable upwards or downwards.
FITTED ON MANY OF THE LARGE ATLANTIC LINERS. *Full particulars sent on application.*

BRASS FITTINGS FOR STEAMSHIPS, also CURLED HAIR, for —— UPHOLSTERY PURPOSES, BLIND ROLLERS, &c., &c. ——

DEIGHTON'S PATENT FLUE & TUBE Co., Ltd.

Telegrams: "Flues, Leeds." Telephone: 1674 (National).

MAKERS of DEIGHTON, MORISON and FOX TYPE of

CORRUGATED FURNACES

For MARINE and LAND BOILERS.

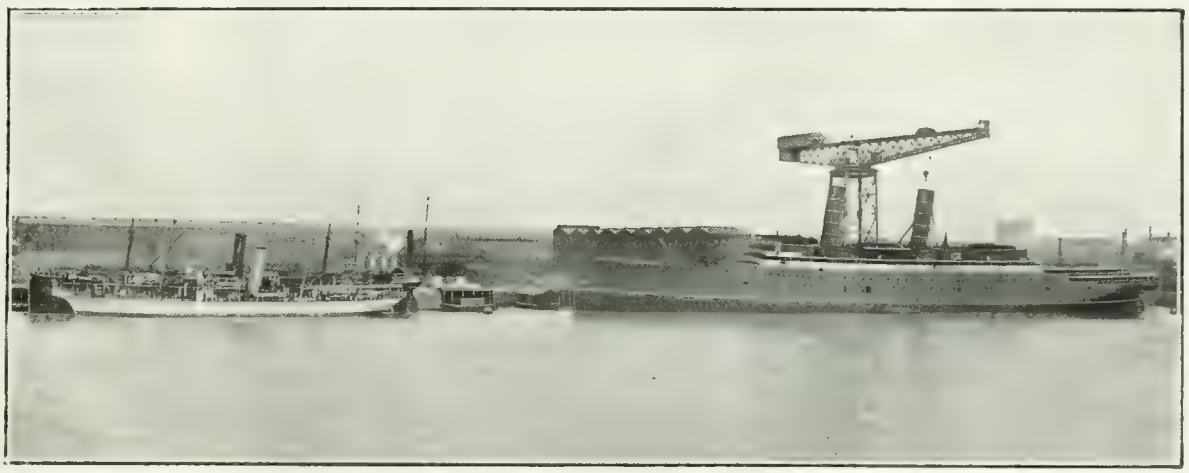
FULL PARTICULARS AND CATALOGUE ON APPLICATION.

No other Type of Furnace has a Greater Heating Surface per foot run than the DEIGHTON Section.

VULCAN WORKS, PEPPER ROAD, HUNSLET, LEEDS.

THE WALLSEND SLIPWAY AND ENGINEERING CO., LTD.

ENGINEERS, BOILER MAKERS and SHIP REPAIRERS &c.



VIEW OF WORKS *shewing* S.S. "BELGIAN PRINCE" *and* C.S. "NORSEMAN" *at moorings,* H.M.S. "NEWCASTLE" *in dock;* *Cunard* R.M.S. "FRANCONIA" *under giant crane.*

DESIGNERS and BUILDERS of RECIPROCATING, TURBINE, and INTERNAL COMBUSTION MACHINERY FOR HIGH SPEED LINERS and MERCHANT VESSELS of ALL DESCRIPTIONS, as well as for TORPEDO BOAT DESTROYERS, FIRST and SECOND CLASS CRUISERS and BATTLESHIPS of the "DREADNOUGHT" and "SUPER-DREADNOUGHT" CLASSES.

LICENSEES and MANUFACTURERS OF INSTALLATIONS FOR BURNING LIQUID FUEL for LAND and MARINE WORK.

HEAD OFFICE & WORKS: WALLSEND-ON-TYNE.

LONDON OFFICE: 30, GREAT ST. HELEN'S, E.C.

TELEGRAMS: "WALL, NEWCASTLE-ON-TYNE."

GRAVING DOCK 540 FT. LONG

KEITH-BLACKMAN

Forge & Cupola Fans.

The efficiency of these Fans is very high, and in many instances their use has resulted in the Power Bill being reduced 50 per cent.

They are fitted with Ball Bearings, arranged for Belt or direct Motor Drive, and made in several sizes suitable for pressures up to 30 ins. W.G.

JAMES KEITH & BLACKMAN Co. Ld.
27, Farringdon Avenue, LONDON.

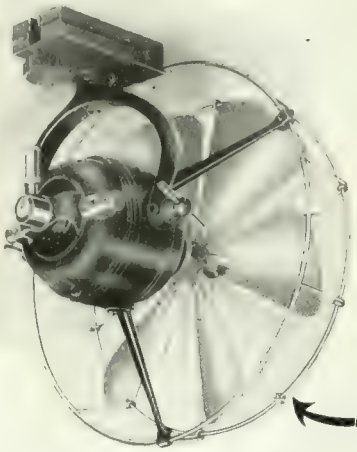
ELECTRIC FANS

EMI

of all types for Ship use.

Superintendents are invited to inspect our electrically driven

PUNKAHS.



Catalogue and Quotations on application from—

HOGAN & WARDROP
2, Gresham Bldgs., Basinghall Street, London, E.C.

Illustration shows Cabin Type, movable Fan with sole plate.

ENTIRELY BRITISH MANUFACTURE.

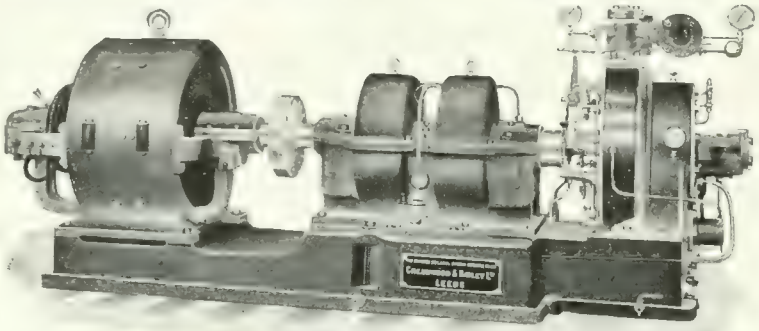
ALL THE ADVANTAGES OF THE HOT BULB ENGINE BUT WITHOUT THE DISADVANTAGES

KROMHOUT

BRITISH MARINE OIL ENGINES
PERMAN & CO. LTD.
82-83 Fenchurch Street
TELEGRAMS APERMACO LONDON — LONDON, E.C. — TELEPHONE 1944 AVENUE
LIVERPOOL AGENTS S.C. CHAMBERS & CO. 3 KING ST. LIVERPOOL

NO HOT BULBS.
NO WATER INJECTION.
HEAVY OIL.

GREENWOOD & BATLEY, LIMITED, LEEDS.



ENGINEERS AND MACHINE TOOL MAKERS.

Electric Motors.

Turbine - Dynamos

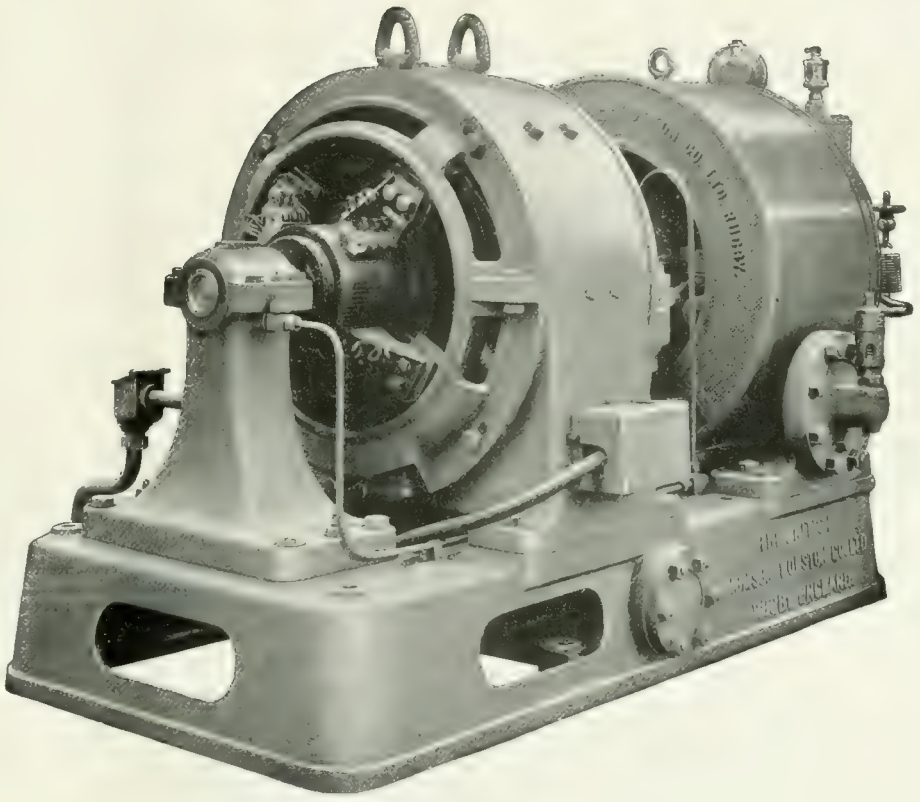
UNEQUALLED FOR SHIP LIGHTING.

Compact. Efficient. Reliable.

The most economical power obtainable

for the operation of lifts, hoists, pumps, winches, workshops, etc., on board ship, is electricity generated by means of

Curtis Turbo-Generators



26¼ kw., 105 volt, 3,000 r.p.m., Curtis Turbo-Generator for Ship Lighting.

These machines are low in first cost, inexpensive to maintain, of exceptionally robust construction, and occupy less space for a given output than any other turbo-generator on the market.

They require no preliminary warming up before use and are therefore available for service at a moment's notice.

Curtis Turbo-Generators for use on shipboard are built in Rugby, England, in sizes ranging from 26 kw. to 200 kw., and are in use on a large number of His Majesty's Ships.

The British Thomson-Houston Company, Ltd.,

ELECTRICAL ENGINEERS AND MANUFACTURERS,

Head Office and Works: **Rugby, England.**

WEIR EVAPORATORS

New and improved designs. Increased efficiency. Reduced weight and space occupied. Special tube couplings, facilitating cleaning and renewal.

Described and illustrated in Catalogue 3.

G. & J. WEIR, Ltd., CATHCART, GLASGOW.

MANUFACTURERS OF

FORGED AND HYDRAULIC PRESSED SHAFTING.

CAST STEEL STERN FRAMES AND RUDDER FRAMES.

BOILER AND SHIP PLATES.

ROTOR FORGINGS FOR TURBINES.

STEEL CASTINGS UP TO 40 TONS.

JOHN SPENCER & SONS, LTD.,

Newburn Steel Works,

NEWCASTLE - UPON - TYNE.

Glasgow Office: 11, Bothwell Street. London Office: 32, Victoria Street, Westminster, S.W.

TELEGRAMS: "NEWBURN," NEWCASTLE, LONDON OR GLASGOW.

Contractors to the Admiralty, War Office, British, Foreign and Colonial Railways, etc.

SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

Published Every Thursday at
QUEEN ANNE'S CHAMBERS, WESTMINSTER, LONDON, S.W.

Branch Offices—
Glasgow: 87, Union Street. Newcastle: 12, Grey Street.
New York: Woolworth Building.

Telegraphic Address: "Recordship, London." Telephone No.: 2247 Victoria.

Subscription, including regular weekly and special issues, published from time to time, payable in advance and postage free:

British Isles	£1 5s. 0d.
Elsewhere	£1 12s. 0d.
Single Copies	Sixpence.

The Editors will be glad to consider articles and paragraphs submitted by competent writers. All accepted contributions will be paid for. Whilst every care will be taken to return unsuitable articles, photographs and drawings (when a stamped addressed envelope is enclosed for that purpose) the Editors cannot hold themselves responsible for the safekeeping of unsolicited contributions.

Vol. VI. Thursday, July 8, 1915. No. 2.

CONTENTS.

EDITORIALS:

Notes on Current Topics	21
The Position of German Shipping	24
The Munitions of War Act	24
Blade Fastenings in Steam Turbines	25
Publications Received	26

ILLUSTRATED:

The Russian Naval Victory	26
SS.s. *Great Northern* and *Northern Pacific*	28
Two New Lightships for the Humber Conservancy Board	31
Floating Dock for Antofagasta	32

MISCELLANEOUS:

A Sailor in the Trenches	26
Motor Lifeboats	27
Germany and Wireless	28
Locking Arrangements at Gatun	31
A Tough Proposition for the Germans	31
Lighthouse for Cape Mala	32
GENERAL NEWS SECTION	33
OFFICIAL NOTICES AND SHIP SALES	39
SHIPPING SHARE MARKET	40

ONLY the pressure of grave national emergency induced Parliament to pass the Munitions of War Act. The enforced settlement of labour differences, the Government control of establishments where munitions are manufactured, the provisions relating to the limitation of profits in controlled establishments are absolutely novel in our industrial history. Employers are not enamoured of these principles. They will not seek to perpetuate any of them in times of peace. It must not, therefore, be assumed that the workmen alone are making sacrifice of the conditions under which they normally work. But we are in the midst of a perilous war, and the vast majority of employers, as patriotic men, have willingly assented to arrangements of which in times of peace they would properly disapprove. In order to win this war we must mobilise industrially. Perhaps the published debates in the House of Commons, particularly those in Committee, gave a wrong impression of the tone of that assembly. A small futile minority absorbed a good deal of the time of the House bringing forward futile amendments. The real temper of the Commons was shown not in the spoken word but in the unspoken weariness which members displayed towards the academic points raised in amendments put forward by Mr. Snowden and his friends. One or two improvements were made in the text, as the result of the more serious part of the discussions. For example, a needful provision was introduced into the clause dealing with the limitation of profits in controlled establishments. Due consideration is to be given to special circumstances "such as increase of output, provision of new machinery or plant, alteration of capital or other matters which require special consideration in relation to the particular establishment." That is only just and fair. Now that the Act is passed we hope that our gallant soldiers and sailors and our Allies will receive in daily increasing quantities the munitions which can suffice to bring victory. We deal with other aspects of the question on page 24.

Munitions of War Act.

A new development in the trade of Hull is recorded by the arrival at Hull of the Belgian steamship *Elizabethville* with a large cargo of palm oil and kernels, gum copal, ebony, ivory, cocoa and rubber from the Congo ports of Matadi and Boma. The vessel is owned by the Compagnie Belge Maritime du Congo, and before the war she used to run from Antwerp to the Congo in this trade. With the fall of Antwerp, the owners have sought for a port of headquarters in Great Britain, and Messrs. Elder Dempster & Co., of Liverpool, who are acting as managers for the company, have opened a branch at Hull, so that the facilities at the new King George Dock can be taken advantage of for this service. According to present arrangements monthly sailings will take place between Hull and the Congo ports of Banana, Matadi, Boma and Noqui, and English passengers will be picked up at Falmouth and Belgian and French passengers at La Pallice. The services will run during the continuation of the war and possibly afterwards.

New Humber Trade.

It appears likely that a decision of the Law Courts will be required to lay down authoritatively the rights of the shipowner and the charterer when a vessel under time charter has been requisitioned by the Admiralty. A case was brought up in court a short time ago in which the question presented itself in a straight issue, but the judge having obtained the consent of the parties decided the case as an arbitrator. He thereupon awarded two-thirds of the Admiralty rate in so far as it exceeded the time charter rate to the charterer and the remaining third to the owners. That may be fair and reasonable in this instance. We have no doubt that it was. But what principles are to govern the adjustment of rights and obligations in other cases? What are the effects on the time charter? Is it terminated or is it suspended? The terms in which it is drawn are probably very different from the uses to which the Admiralty will put the vessel. It does not follow that in all cases the Admiralty rate will equal the amount paid by the charterer. All these matters require elucidation.

Requisitioned Vessels and Time Charters.

Of late legislators in the United States have not, to say the least, been particularly happy in dealing with the shipping industry. Apart from unsuccessful efforts to develop the national mercantile marine, in order to take advantage of the European situation, the Seamen's Act, which comes into operation in November next, is, for instance, a conspicuous example of an irritating policy, the consequences of which may be much more serious than most members of Congress anticipate. Already, in fact, no fewer than 21 countries have been notified of the intention to terminate existing treaties with them that are in conflict with the measure, and, so far as American maritime trade is concerned, it is believed that the Stars and Stripes will disappear from the Pacific, except along the western seaboard of the Republic, and that Japanese steamship lines will to a very large extent monopolise trans-oceanic traffic. This, however, is not all. According to information received from the British Ambassador at Washington, the United States Customs Court has decided that the clause in the Underwood Tariff Law of 1913, granting a reduction of 5 per cent. on goods imported in American ships, is valid and may take effect forthwith. Moreover, the rebate must be allowed on imports carried in the vessels of all nations with the exception of France, Russia, the British Colonies, Mexico, Brazil, and some smaller countries. This decision, it is added, has created a serious situation for the Wilson Administration, and may involve it in a maze of legal and diplomatic complications. It also means a loss of revenue of about £4,000,000, which has been collected since the tariff came into force, and which will have to be refunded to importers. The Government is, in addition, faced with a possible loss of £125,000

The "Discount" Ships.

a month unless a special session of Congress is summoned to pass an enabling law. This provision which was designed solely for the building up of an American merchant marine is held to apply equally to a large number of foreign ships.

Port of Leith Custom.

It is now judicially declared to be a custom of the Port of Leith that cargoes of barley arriving from the North Pacific coast are to be discharged by bulking the grain in the hold and delivering it into the receiver's sacks on deck. The *Strathlorne* arrived in Leith from Portland, O., with a complete cargo of barley for a firm of maltsters, who wished to take delivery of it in the sacks in which it had been shipped. That was a difficult undertaking because a large number of them had been cut with knives in order that grain might be loose amongst the full sacks and so "stiffen the ship." The shipowners therefore took objection to the request made to them, pointing out that it did not follow the custom of the port. At last, under reservation of their claims, they agreed to deliver it as desired, but the method of discharge in this fashion was more expensive and took longer than the practice which they proposed to follow. Accordingly, they asked payment on account of extra cost of discharge and demurrage. The receivers of the cargo denied the existence of the custom on which, of course, this extra payment was based. After being unsuccessful in the outer House of the Court of Session the owners of the *Strathlorne* established the existence of the custom to the Second or Appellate Division, and with it their claim.

Egyptian Shipping Facilities.

Notwithstanding the general dislocation of traffic caused by the war, and the postponement of several improvement schemes, good progress, we understand, is being made with the extension of shipping facilities in Egypt, although, in the circumstances, the work will not be completed for some time yet. The important new route from Mansourah and the intermediate cotton-producing districts is of great advantage to exporters, particularly as through rates to United Kingdom ports are now available. It is, in fact, expected to result in a large increase of trade at Port Said, which will make it a serious rival of Alexandria. At the latter port, however, a big project, with a view to transforming the Mahmoudieh Canal into a great fluvial harbour is under consideration. At present, the district is under an extraordinary variety of conflicting administrations, and there is no special and independent body to supervise traffic by water. It is, however, understood that a Conservancy Department is to be formed to carry out navigation regulations, so as to improve the handling and facilitate the movement of goods to and from the interior. Just now it is not uncommon for boats to be jammed for three weeks at a time owing to the congestion of traffic and the lack of effective control, but the plans that have been approved should remedy this unsatisfactory state of affairs and result in a big development of trade. As a matter of fact, so far as shipping is concerned, Egyptian prospects were never more promising.

Trade Winds and Panama.

An interesting development arising out of the opening of the Panama Canal is the alteration taking place in the trade routes of sailing ships. In consequence it is felt that more extensive knowledge of seasonal winds over various areas would be of value in connection with this traffic. Consequently, arrangements are being made with the United States Hydrographic Office to supply information as to the following six general routes:—For sailing both ways, between the Canal and the west coast of the United States, the west coast of South America, the east coast of the United States, the Gulf coast of the United States, European ports, and ports across the Pacific. It is the intention to embody this information in sailing directions for sailing vessels and publish it as a notice to mariners. The use of the Canal involves a considerable shifting of routes for these vessels, and as some of the areas to be crossed have not been frequented a great deal heretofore by sailing ships, accurate sailing directions are not at present available. As an example of the use of the Canal by sailing ships we may note that the four-masted steel barque *Bell* was despatched from Balboa on June 10 after passing through the Canal on the way to Japan from Philadelphia, and the barque *Daylight* is on her way from New York. The vessels are practically sister ships, and among the large sailing vessels in the world. The *Bell* is 352 ft. long by 49 ft. in the beam and 28 ft. deep, and has a net tonnage of 3,609 tons; the *Daylight* is 1 ft. less in length than the *Bell*, with her other dimensions the same, and has a net tonnage of 3,599 tons. The *Bell* was launched as the *Brilliant*, having been built, like the *Daylight*, for the oil trade and named, like her, for a brand of oil.

Quarantine Inspection at Panama.

Vessels entering the ports at the terminals of the Panama Canal, or entering the Canal for transit, and especially passenger vessels, will secure *pratique* more promptly by having the crew and passengers mustered for inspection by the time the quarantine officer comes aboard. Cabin passengers are to be assembled in the main saloon, steerage passengers in a suitable place on the main deck, and the crew by departments, such as deck department, engine room department, &c. The process of mustering the passengers and crew is in all cases to be carried out by the ship's officers, so that, with the lists furnished by the purser, the quarantine officer may make a prompt inspection. No appreciable difficulty in this respect has occurred with the cargo boats using the Canal, but it has happened that on passenger vessels, especially large ships carrying numbers of excursionists and sightseers, many of whom appeared unfamiliar with the customary practices in marine travel, considerable delay has occurred in bringing all of the passengers together as required. Failure to do so has caused several hours of delay, and if such occurred on a vessel arriving at a port of entry relatively late in the day the loss of time in this manner might delay the transit of the vessel to the next day.

Antwerp a Hanseatic City!

A long serial article in *Hansa* dealing with conditions and improvements, actual and desirable, in the German mercantile marine, leads to the conclusion that a number of reforms are still essential. Since German owners had been having none too good a time for years before the war and have since been subjected to very heavy losses and unproductive expenses, it is suggested that a small increase in rates will be necessary to cover the cost of improving the lot and remuneration of sailors. This increase should be made by all the large owners simultaneously, and the belief is expressed that merchants and manufacturers would submit to it willingly. "It is uncertain how neutral trade will develop with our present enemies, but it is certain to flourish rapidly with us, and 1914 will represent one of the steps in development of German shipping." Following this optimistic train of thought, the writer remarks that the shipping of Hamburg and particularly of Bremen will undergo some displacement when Antwerp becomes the chief centre of export from the Rhine district. Further, he propounds the interesting question: "Is it advisable to make Antwerp a free Hanseatic town?" The answer may safely be left "to our leading owners who are certainly already engaged in settling how shipping is to be developed after the war." If this really be so, a fresh set of plans will be needed before work can actually be commenced! The writer commiserates feelingly with Hamburg and Bremen over the loss of capital they will sustain due to deflection of traffic to Antwerp, and the many hopes which will consequently remain unfulfilled. He maintains, however, that both towns will find recompense in the foundation of new industries, but, personally, we have no hesitation in assuring Hamburg and

Bremen that loss of trade to Antwerp in the above manner is the least probable of the contingencies they may anticipate.

Admiralty Inventions Board.

It is officially announced that Admiral of the Fleet Lord Fisher of Kilverstone, G.C.B., O.M., G.C.V.O., LL.D., has been appointed Chairman of the Inventions Board which is being established to assist the Admiralty in co-ordinating and encouraging scientific effort in its relation to the requirements of the Naval Service. Details concerning the personnel of the Board and the full scope of its powers have at the moment of writing not yet been published, but the announcement so far as it goes is a most satisfactory, even if belated, indication that the Admiralty are alive to the necessity for "co-ordinating, and encouraging scientific effort." We are not among those who believe that the Admiralty are entirely blind to the developments which take place almost daily in one or the other of the many branches of naval science. The annals and prestige of our Navy are themselves evidence of the spirit of progression. But even making allowances for the chagrin of *soi-disant* inventors whose ill-digested schemes are poured into Admiralty departments with more persistence than practicability, and allowing for the whole genus and species and sub-species of crank inventor, one cannot admire the policy which necessitates such an uphill fight under most disheartening conditions before recognition is given to the results of a really skilful series of investigations. If the words "co-ordinating and encouraging" have been put into the official notice with deliberate intent it is a happy augury for research workers.

Blade Fastenings for Turbines.

Elsewhere in this issue there appears an abstract of an interesting paper dealing with the subject of "Steam Turbine Blade Fastenings," contributed to the most recently published issue of the Journal of the American Society of Naval Engineers by Mr. James A. Capstaff, of the New York Shipbuilding Company. In this the author states that repeated tests have proved that the efficiency of turbine engines varies with the blade speed and number of rows of blades and that the number of blades varies inversely as the square of the blade speed for a given efficiency. That is to say that a turbine running at 600 r.p.m. requires 64 rows of blades to show a certain efficiency, whilst another turbine having the same mean blade diameter and the same height of blade would only require eight rows if running at 1,200 r.p.m. for the same efficiency. From this it will be seen that increasing the number of revolutions per minute offers increased efficiency with smaller turbines and the tendency is to develop along these lines. The question that arises is that of how far it will be possible to go on increasing the peripheral speed of the blades and reducing the size of the turbine, and the answer to this must be found in the strength of the material used in their manufacture. Theoretically the limit would be reached when the mean blade speed equals between ·75 and ·9 that of the steam in the case of a reaction turbine, and ·5 in the case of a pure impulse turbine. Quite a common pressure drop through a turbine is from 265 lb. per sq. in. down to 28 in. vacuum. This drop in pressure represents a steam velocity of 4,200 ft. per second.

Economy in Fuel.

Many types of machinery are now available for the propulsion of ships, but the majority of vessels are still fitted with triple-expansion engines of the reciprocating type. This is due to their reliability and to the thorough acquaintance of marine engineers with this type. It is also a matter of discussion whether the ordinary marine engine can be bettered for general economy, although the consumption of fuel per horse-power is much greater than in Diesel oil engines. It is considered by competent critics that the supplanting of steam-driven reciprocating engines is not imminent. The various means of increasing the efficiency of reciprocating machinery have not been exhausted, and until these are, there is no likelihood of the extinction of this type. In estimating the amount of coal necessary for a given length of voyage for the average ship a coal consumption of 1·5 lb. per indicated horse-power per hour is generally accepted. This is a figure which has been considerably improved upon by some vessels. In the Cunard liner *Saxonia*, for example, the coal consumption per indicated horse-power worked out at from 1·2 to 1·3 lb., which shows a remarkable degree of economy. On the other hand, many vessels exceed this figure. It has been stated that some of the American river steamers use from 6 to 9 lb. per indicated horse-power per hour, but in these cases old non-condensing non-compound engines, which have probably served two or three hulls, are in use. The introduction of the triple and later of the quadruple-expansion engines brought about great economy as compared with the old single and compound engines. The use of superheaters and superheated steam still further ensures economy. With these in use in quadruple-expansion engines the coal consumption works out to from 1·1 to 1·2 lb. per indicated horse-power, and in triple this figure is slightly greater. In these days of dear coal any economy which can be effected in fuel is welcomed. Apart from the improvements made in the machinery to ensure such economy more skilful firing of the boilers should be enforced. The successful operation of marine machinery depends more on the proper use of the coal than on any other part of the business, and this can only be obtained by the skilled engineer thoroughly supervising the stoking.

Strength of Bulkheads.

In a previous note on the strength of bulkheads we drew attention to the tests which have been made by the Bulkhead Committee on the experimental cofferdam, and recognised the value of such methods for the determination of proper scantlings of bulkheads. In that note we stated that "in actual cases of ships being lost the bulkheads are known to have given way under the strain to which they were subjected." This statement has been questioned by the Bulkhead Committee, who have not yet had evidence laid before them of bulkheads actually giving way and causing the loss of any vessel. The remark referred to was based to a large extent on a statement made by Prof. Hovgaard in a paper on the "Strength of Watertight Bulkheads" read before the American Society of Naval Architects and Marine Engineers in 1909. In this he said: "Many different systems of construction have been used . . . but it cannot be said that we have yet reached a satisfactory solution. The most striking evidence of this is perhaps the loss of the White Star liner *Republic* which, according to various accounts, was due ultimately to leakage and breakdown of the bulkheads." It appears that at an early stage in the proceedings of the Bulkhead Committee their attention was directed towards Prof. Hovgaard's opinion regarding the failure of these bulkheads, and no positive substantiation was obtained from the evidence which was laid before them that any of her bulkheads gave way under water pressure. In view of the exhaustive inquiry which the Committee has made, and of the expert evidence which was laid before them, we accept their statement entirely, viz., that there is no direct evidence to show that vessels have been lost through the bulkheads being unable to stand the strains to which they were subjected. The very fact, however, that the Committee went so thoroughly into the question of the strength of bulkheads shows that the members of it were not satisfied with the existing standards, and some of the tests with the experimental bulkhead gave practical illustration of bulkheads bursting. Ships being lost through bulkheads giving way is most probable, but the loss of the witnesses with the ships denies us the direct evidence which alone can give verification to a most probable occurrence.

THE POSITION OF GERMAN SHIPPING.

PARTICULARS concerning the financial position of the leading German shipping companies reach this country from time to time, and although the number of detailed reports is few the dividend situation current generally becomes known. The table below gives particulars of some of the leading companies with, so far as can be ascertained, the number of ships comprising their respective fleets, the number of vessels sunk or in the hands of the Allies, and the dividends during the past two years:—

Shipping Companies.	Ships owned.	Ships sunk or captured	Dividends. Per Cent. 1913	1914.
[illegible]	—	[illegible]	7	5
[illegible]	7	3	10	0
[illegible]	26	9	8	6
[illegible]	41	2	22½	22½
[illegible]	6	2	15	0
"Hansa," Dampfschiffahrts A.G., Hamburg			6	4
[illegible]	2		4	4
[illegible]	49	3	14	4
[illegible]	68	32	20	6
[illegible]	11	1	10	12
[illegible]	23	5	16	6
[illegible]	3		6	6
Neue Dampfer-Kompagnie, Kiel ...	17		8	7
[illegible]	22	2	8	0
"Nord" Dampfer Co.	70	13	16	0
[illegible]	—	—	9	0
[illegible]	1	1	10	0
[illegible]	25	5	16	0
Ozean-Dampfer A.G., Flensburg	4	—	10	0
Rhederei A.G., von 1896, Hamburg	26	9	10	4
[illegible]	—		8	4
[illegible]	16	2	8	4
Seefahrt Dampfschiffsreederei, Bremen...	3	1	8	0
[illegible]	11		10	8

Many of the company results which in the ordinary course would have been published long before this are not yet known, for the reason that special Government sanction had been given to some of the concerns to suspend the publication of their accounts for the time being. Among the companies which come under this category are the Hamburg-Amerika Line, which gives as its reason the difficulty of securing reports from their various agents abroad. The Norddeutscher Lloyd, we believe, gives no reason, leaving to inference the obvious one which the Hamburg-Amerika Line might have adopted instead of the puerile excuse offered. There are also lacking a number of subsidiary companies of the Hapag, although some concerns associated with this company, it should be noted, have published their reports, or at any rate announced the passing or a reduction of the customary dividends.

Prior to the advent of Italy, the Hamburg-Amerika Line was remarkably—and significantly—fortunate in having most of its vessels in neutral ports. So far as we can gather, only 24 vessels were in the hands of the Allies prior to the advent of Italy, but when this country joined in the fray 11 substantial vessels of this line were seized and may be considered a loss to the company. The Hansa Line, which already had very nearly half its ships in the hands of the enemy, lost two more ships when Italy entered the fray; and the German Levant Line had its confidence in the neutrality of Italy shaken to the extent of 11 ships. Similarly, Rob. M. Sloman, junr., whose accounts do not appear to have been published so far, lost 9 ships in Italian ports, and the Norddeutscher Lloyd lost 5 in the same way, the figures quoted being the actual admissions by the German Press, and so are not likely to err on the side of exaggeration. The total loss of German shipping which Italy has seized is, according to the same sources, over 150,000 tons gross. It will be seen, therefore, that as the war has progressed German shipping has suffered more and more keenly.

Turning to the list published above, it may be observed that in the case of the Hafen Company, their receipts were £15,600 down, but that owing to economies which the company could effect through their boats lying idle, the net profits were brought down to about £5,500 difference, which the company professes to consider a satisfactory figure considering all circumstances. The Hansa Company's profits dropped from £439,528 to £87,282. The Kosmos Line realised a net profit of only half the previous year. The Neue Dampfer Company, of Stettin, made no profit compared with £835 the previous year; and the Nieder-und Mittelrhein Company's receipts were £32,300 down. The Norddeutscher Frachtdampfs. A.G., which appears to have lost the only ship it possessed, records a loss of £3,000 as compared with a profit last year of £8,700. The Oldenburg Portugese Company made half the customary profit, and in order to take the fullest advantage of any regeneration of its finances after the war, has transferred its offices from Oldenburg to Hamburg, believing that by being actually on the spot it will have a better opportunity of at any rate securing some of the crumbs that might be going around. The Roland Line has set aside £17,600 for special war contingencies, this being, in fact, the same amount as it transferred to the reserve fund last year. This year it puts to reserve £2,500 and to the renewal fund £5,000, compared with an allocation for renewals of £20,000 in 1913. It will be seen, therefore, that German shipping is feeling the effect of the war very severely, and even discounting the roseate views sent out by German wireless concerning other branches of industry it has probably had the severest blow of all German commerce. The tale that is told by the above figures is probably as optimistic as the directors of the various concerns could place their position and the real story has yet to be unfolded. It would be easy to compare these results with the figures of another big naval Power, namely, ourselves, and great as their chagrin is at our command of the seas it must be even more annoying to German pride when they consider the prosperity of the shipping of the smaller neutral countries, particularly as to some extent this shipping prosperity means the bringing of war supplies indirectly into Germany which ought to be carried in German ships.

THE MUNITIONS OF WAR ACT.

DURING the whole progress through Committee of the Munitions of War Bill the Government deferred to the trade unions—to, at any rate, the trade unions which signed the Treasury Agreement—with the result that the Act which on Friday received the Royal Assent contains nothing the National Advisory Committee on War Output can reasonably object to. The miners and the cotton operatives which were not parties to the Treasury Agreement are presumed to be less directly affected by the provisions of Part I than are some of the others. But as a simple matter of fact they are as little free to strike as are the others. They must not strike nor may their employers lock them out.

Clause 2 sub-section (1) originally read as follows:—"An employer shall not declare, cause or take part in a lock-out, and a person employed shall not take part in a strike in connection with any difference to which this part of this Act applies unless the difference has been reported to the Board of Trade, and a month has elapsed since the date of the report and the difference has not during that time been referred by the Board of Trade for settlement in accordance with this Act." The idea of the allowance of a month was, no doubt, to give existing agreements like the Engineering Provisions for Avoiding Disputes a chance of adjusting differences. In ignorance of the fact that there is in several trades machinery of the kind, Mr. Snowden endeavoured to get the period reduced to three days. Eventually the Minister in charge agreed to 21 days, and the change was accordingly made.

It is not a workmanlike alteration, for its effect will be to speed-up machinery which was in the opinion of the workmen concerned in no need of quickening. A good deal will depend, of course, on how the men regard the earlier arbitration awards. If

they find that the Impartial Tribunal is inclined to give them more than Central Conference they will report everything to London. While the war lasts that sort of thing will very probably hardly matter, as employers generally are not unlikely to be of the opinion that having taken over their business the State ought also to take over their Labour troubles. There is, however, a post-war danger here which need not be ignored. Clause 20 sub-section (2) originally was :—"This Act shall have effect only so long as the office of Minister of Munitions and the Ministry of Munitions exist." In Committee, these words were added :—"Provided that Part I of this Act shall continue to apply for a period of 12 months after the conclusion of the present war to any difference arising in relation to the performance by the owner of any establishment of his undertaking to carry out the provisions set out in the Second Schedule to this Act notwithstanding that the office of Minister of Munitions and the Ministry of Munitions have ceased to exist."

As matters stand, there is a considerable difference of opinion between the employers and the trade unions as to what were pre-war conditions of employment. When the hostilities come to an end there is almost certain to be, at any rate, no diminution of it. In the opinion of some people the only cure for trouble of that kind is compulsory arbitration. A good deal depends, however, upon the character of the difference and the technical qualifications of the arbiters to deal with it. There are, for instance, prospective difficulties in engineering which will only be aggravated by "splitting the difference." Without being unduly pessimistic, we offer the opinion that the effect of this addition to the Act will be bad.

Of the other changes made in the interests of Labour the only one of importance from the point of view of the practical man is, probably, that to Clause 4 of the Second Schedule. This schedule is, as we have mentioned, taken almost verbally from the Treasury Agreement. As originally drawn, Clause 4 was as follows :—"Where the custom of a shop is changed during the war by the introduction of semi-skilled men to perform work hitherto performed by a class of workmen of higher skill, the rates paid shall be the usual rates of the district for that class of work." In the Act the words after "skill" are "the time and piece rates paid shall be the usual rates of the district for that class of work."

In order to grasp the significance of the alteration it is necessary to go to the Shells and Fuses Agreement, Clause 6 of which is as follows :—"Operations on which skilled men are at present employed, but which, by reason of their character, can be performed by semi-skilled or female labour, may be done by such labour during the war period. Where semi-skilled or female labour is employed in place of skilled labour the rates paid shall be the usual rates of the district obtaining for the operations performed." The Amalgamated Society of Engineers and the Engineering Employers' Federation differed in their interpretations of the latter part of the clause, the men's representatives claiming the district time rate for women and semi-skilled men, and the employers insisting that there ought to be some relationship between the rate and the output. A central conference discussed the matter and failed to agree. Now, by a side wind, the A.S.E. have obtained Parliamentary sanction for their interpretation.

Employers whose profits are limited by the Act got very little out of the Government during the Committee stage. Still, they were not sent away altogether empty-handed. It was explained to them that the standard of profits was not to apply to controlled establishments until they came actually under the control of the Minister of Munitions. That means that any profits which have been earned on increased capital expended since the beginning of August are not affected. Moreover—this really is the most important concession made to employers—clause 5 sub-section (3) was altered so that in the Act it stands :—"The Minister of Munitions may make rules for carrying the provisions of this section into effect, and these rules shall provide for due consideration being given in carrying out the provisions of this section as respects any establishment to any special circumstances such as increase of output, provision of new machinery or plant, alteration of capital or other matters which require special consideration in relation to the particular establishment."

The standard of profits plus a fifth is not, as we have said from the first, very generous. But with this addition to sub-section (4) and the provision made in sub-section (3) the position of the owners of controlled establishments does not appear to be inadequately safeguarded.

BLADE FASTENINGS IN STEAM TURBINES.

A CONTRIBUTION of much practical value to the subject of steam turbine blade fastenings appears in the most recent issue of the Journal of the American Society of Naval Engineers on the subject of "Steam Turbine Blade Fastenings," the author being Mr. Jas. A. Capstaff, of the New York Shipbuilding Company. It is contended that the possibility of ever reaching the theoretical blade limit is indeed remote, but the tendency is to go on increasing the blade speed. The author pointed out that Messrs. Parsons seldom exceed 550 ft. per second at the mean diameter of the last expansion, Curtis as high as 700 ft. per second, and De Laval 1,375 ft. per second ; all a long way behind the theoretical most efficient speed. With the increase of the revolutions, if the diameter is kept down the blade heights must run up. This cannot be done without taking the strength of the blade and its fastenings.

In the turbines of to-day it is highly essential to bind a number of the blades in a row together, either by means of a shrouding or lacing wires, in order to strengthen them against the fatiguing effect of the high period of vibration set up in the blade when running.

It would, of course, be desirable to have this shrouding or lacing, as the case may be, continuous, but, owing to expansion troubles due to the use of different metals for the turbine rotor and the blades, this is impracticable. Provision must be made to take care of the expansion. Previous to the adoption of the blade ties, blading gave no end of trouble through breaking at the roots. The author mentions in passing that shrouding is used on impulse turbines to serve a double purpose. Besides tying the blades it prevents the lateral spreading of the steam jet on its passage across the turbine blade. Shrouding is not absolutely essential on reaction turbines, as the radial clearances between the rotor-blade tips and the cylinder walls are very fine ; but one form of binding must be used. Channel shrouding is used by some builders as a safeguard against damage through blade stripping. At the time of its inception blade stripping was of common occurrence ; if one single rotor blade fouled with the cylinder wall the destruction of at least the rows in which it was contained was almost certain.

For some years now Messrs. Parsons have adopted the idea of thin tipping their turbine blades for a small portion of their length, and should a revolving blade creep far enough from its root fastening to foul the casing the sharpened tip of the blade will simply be turned over and the rest of the row will not be affected.

In recent years impulse turbines have come to the front. The author of the paper believes that they have much to recommend them, and when the mechanical design receives the attention it deserves, more will be heard of them in naval work. The fact that Messrs. Parsons have incorporated an impulse element in their reaction turbine lends some colour to this remark.

With the development of the impulse turbine in particular the tendency to speed up is most marked, and this is bringing into being blades of much heavier section than have hitherto been used. Heavier blades and higher velocities keep the designer's mind constantly working in the endeavour to provide a root fastening strong enough and reliable enough to take care of the increasing loads imposed upon it. That this is no easy proposition must be admitted.

PUBLICATIONS RECEIVED.

[A short notice in this publication does not necessarily preclude the subsequent appearance of a longer review.]

The Design of Drill Jigs. By Andrew N. Hicklow. 1915. Machinery Publishing Co., Ltd., 66, King Street, London, W.C. [illegible] pp. 96. Cloth, price 2s. 6d. net.

This handy volume, the contents of which first appeared as a series of articles in the *Machinery* [illegible], should prove extremely useful to draughtsmen and others who are called upon to design special tools and other appliances used in interchangeable manufactures. The book, which is of handy dimensions, contains 10 chapters, and the arrangement of the subject-matter is well carried out. The duties of a jig and tool specialist are defined in the early part of the introductory chapter, and from this beginning the further development of the subject is carried through its various stages until the final chapter is reached. This treats of special jigs, and the necessary instructions for carrying out the design of such are presented in a clear and terse manner, accompanied by a number of drawings which will be of considerable assistance to the reader. The work is well illustrated throughout, each chapter having its fair quota of drawings according to the branch of the subject dealt with. The author states that he has endeavoured in this work to give the results of his own experience in the hope that it may be helpful to those intending to devote their attentions to this branch of designing. If the contents are carefully perused there can be little doubt we think that the hope expressed by the author will be realised.

A SAILOR IN THE TRENCHES.

The following letter has been received by the Secretary of the Imperial Merchant Service Guild from a ship's officer who enlisted in the army at the outbreak of the war (Sergeant J. C. Browning, Rifle Brigade) and has seen considerable service in the firing line :—

"I am writing a few lines to keep in touch with the blue cloth—once a sailor always a sailor, in spite of khaki. Whilst I am pretty familiar with what is happening on the briny, I daresay a few Guild members would like to know what the trenches are like, so I will get up as much steam as I dare ('ware Censor !).

"First of all, the inevitable ship has to come into the picture, as it always has before one can get any further, and there is of necessity a very good imitation of the pilgrim run to Jeddah as far as room is concerned, only we don't chatter quite so much, neither do we get our prayer mats out, as it would have reminded us too much of the Swedish drill—double knee bend. My first experience of trench warfare is worth relating. We came up the line in cattle trucks, and after some apparently aimless marches we were told that we would get our first experience of trench warfare that night. After waiting awhile we streamed the log and set a course for the trenches. We brought ruined houses and villages abeam, and took four-point bearings of different landmarks as we passed them. It was necessary to do so as we might have been obliged to 'bout ship. I could not help noticing that the churches and houses want dry-docking badly as a few of them have been in collision with S.M.S. 'Jack Johnson,' and a host of other craft of that description that travel at a reckless speed without any regard whatsoever for other people's lives, and don't try for safe navigation.

"When we get in the main trenches we make what they call communication trenches, and by steering various courses we submarine our way up to the front line trench where parapets are sandbagged with specially constructed platforms. Astern of this are dug-outs—small square holes sandbagged, roofed in and made bomb proof. Here we sleep a little at times. The support trenches which are still further abaft these contain an assortment of food, principally bully beef. We are all fairly sick of it, and a few sailors here who have become leather necks wish for the old salt horse again. The day passes quietly enough, a man or two in each bag—*i.e.*, between the traverses—is on the look-out with periscopes as it is dangerous to show oneself. The rest get a wash and a shave if lucky, and the day is spent sleeping and working in the hours appointed. Now and again the artillery heave a few shells over in the direction of the Germans, and they, in turn, return the compliment. Sometime trench mortar and rifle grenade compliments are paid, frequently ending in casualties. On these, rifle bullets do their share. Before dark we stand to arms in case of an attack. Then night watches are told off and the sentries on the fire-platforms keep themselves and the Germans awake by potting at their lines. Parties from both sides go out mending wire entanglements, but when they are discovered there is a lively fusilade. Then things become normal again. Before dawn we stand to arms, and when all possibility of surprise is over we settle down for the day, that is, of course, an ordinary day. When there is an attack, what with hundreds of guns exploding all round our heads, there is 'some' pandemonium, and not a few casualties. The best part about our army is the officers and men in it who have proved their courage time after time.

"Wishing you all sorts of success, and hoping we will soon have peace and plenty without the N.D.L.'s and H.A.L.'s and Hansas who spoil our prospects."

THE RUSSIAN NAVAL VICTORY.

On Saturday the announcement was made that in the course of a naval action in the Baltic a German battleship of the *Deutschland* type was sunk by a Russian submarine. The *Deutschland* is a pre-Dreadnought type of vessel of about 13,000 tons displacement, 18·5 knots speed, and carries four 11-in. guns. An illustration of the vessel appears on page 29. The official statement issued from Petrograd, under date July 2, states :—

"This morning, parallel with the Oestergarn Lighthouse on the east coast of the Island of Gothland, our cruisers encountered in the fog two of the enemy's light cruisers and some torpedo-boats, and engaged in battle with them. A 9 o'clock in the morning a German cruiser, badly damaged, lowered her flag and ran ashore. The other cruiser with the torpedo-boats made off.

"At 10 o'clock in the morning our squadron encountered the armoured cruiser *Roon* (9,350 tons, with four 8·2-in. guns), a light cruiser, and a torpedo-boat, and renewed the battle. At 10.30 the enemy began to retire towards the south. During his retreat the enemy, who had now been joined by another light cruiser, was attacked by our cruisers and fled. At 11.30 the pursuit ceased.

"After the battle our squadron was attacked by submarines, but without success. The damage to our cruisers is quite insignificant."

The Germans admit the loss of the light cruiser *Albatros*.

Argentine Harbour Developments.—The message of the President at the opening of the Argentine Congress on May 10 contains the following information on the harbour works of Argentina in 1914 :—In the new port of Buenos Ayres the third and last inclosure has been finished, the outer breakwater is now more than half of its total extension, while the bridge and 500 metres of filling-in work have been accomplished. The south arm which, together with the outer breakwater, forms the entrance to the new port is almost completed. Dredging work and the construction of warehouses are being carried on, the total value of the works contracted for up to the present being 5,561,528 pesos gold. The works and installations of the port of Rosario have been amplified considerably. In Puerto Militar, where extension work is also going on, the large careening dock, with a capacity for the new war vessels *Moreno* and *Rivadavia*, has been completed. As regards the ports of Mar del Plata and Quequen, and the dredging and conservation of the navigation routes, the approved scheme of works has been strictly carried out; the improvements in connection with the bar of Punta de Indio, the canals of access to the port of Buenos Ayres and the Rivers Uruguay and Paraná, and the navigation of the Bermejo, are especially notable.

MOTOR LIFEBOATS.

The provision of at least a couple of motor lifeboats is now regarded as standard practice on large liners, but the hopes once prevalent, that every lifeboat would be fitted with propelling motor, are not likely to be realised. Even in the present high state of development of motor craft, the weight and space occupied by the propelling equipment reduces seriously the passenger-carrying capacity of a lifeboat. The trend of present design is towards equipping, say, two boats with engines, wireless telegraphy, and various emergency stores, &c., and then imposing on these parent boats the duty of towing, attending, and, in general, shepherding a flotilla of ordinary lifeboats.

From the adjoining table it will be seen that the dimensions and weights of these representative motor lifeboats approximate to the upper limits usual in ordinary lifeboats, and usually the engine power provided is between 15 and 30 h.p. All are moderate speed boats and dimensions and power are likely to be yet further standardised.

single-ended boat (No. 7 in table) is built on the lines of a trading vessel and is quite suitable for use as captain's gig on a merchantman. An innovation approved in the later type of covered-in Lundin boat is the provision of holes in the side walls of the superstructure to permit the use of oars in emergency. Equivalent provision should be made on every motor lifeboat, otherwise there is a danger of its being left a helpless hulk by exhaustion of its fuel supply.

Access to the forward slings in the motor boats of the *Alsatian* and *Calgarian* is said to be difficult owing to the cabin superstructure running uninterruptedly from stem to a point aft, well over half the length of the boat. The provision of submarine signalling apparatus is an important addition, but its present small range limits its utility.

The motor boats of the *Ciudad de Buenos Ayres* and *Ciudad de Monte Video* have limited speed and radius of action, but these vessels are engaged only in the traffic between the ports from which they take their names. Concerning the *Missanabie's* single open boat, no details have yet, we believe, been published.

The precise sphere of utility of motor lifeboats cannot be

Motor Lifeboats.

No.	Description or vessel.	Dimensions. L × B × D	Ratio. L/B	Ratio. L/D	Ratio. D/B	Engine h.p.	Knots.	Fuel tank capacity.	Radius of action. Sea miles.	Radius of action. Hours cruising	Weight ready for sea (tons). Without crew.	Weight ready for sea (tons). Fully laden.	Passenger accommodation
		ft. in. × ft. in. × ft. in.						Gallons.					
1	*Imperator*	31 3 × 9 3 × 4 0	3·39	7·91	0·43	22				—			—
2	*Aquitania*	30 0 × 9 6 × 4 6	3·16	6·67	0·47	30	7	50	140	20	5½*		—
3	*Britannic*	34 0 × 10 0 × 4 0	3·40	8·50	0·40	15	6	50	240	40	4†		20–30
4	Double ended boat	28 0 × 8 0 × 3 9	3·50	7·48	0·47	15	7	40	220	32	3†	5½	30
5	,, Seamless Boat I	24 0 × 7 0 × 3 0	3·43	7·78	0·44	15	8	12	90	11	2	3½	19
6	,, Seamless Boat II	28 0 × 8 0 × 3 6	3·50	7·97	0·44	14	7	11	90	13	3	6	41
7	Single ended boat	28 0 × 7 0 × 3 3	4·00	8·88	0·45	30	9	30	100	12	2½	4½	25
8	Lundin boat	36 0 × 12 0 × 3 3	3·00	10·85	0·28	36	6	—	—	—	5–6	12–13	100
9	*Alsatian*	28 0 × 8 0 × 3 9	3·50	7·61	0·46	20				40	—		—
10	Cabin boat	31 0 × 9 6 × 3 9	3·27	8·29	0·39	28	8						30
11	*Ciudad de Buenos Ayres*	28 0 × 8 0 × 3 6	3·50	7·96	0·41	10	6	20	70	12	—		
12	*Missanabie*	30 0 × 9 0 × 3 6	3·34	8·53	0·39	—	—	—	—				—

* Propelling equipment complete weighs 2,000 lb.

† Propelling equipment complete weighs 1,320 lb.

The *Imperator's* motor boats are of the open diagonal type, built on the standard Hamburg-Amerika lines of lifeboat construction with stern form similar to that of motor boats used at the German coast lifeboat stations. The protection provided for the Daimler engine deserves mention. A watertight iron cover is used, with detachable covers for easy access and packed glands for parts which necessarily extend through the casing. An automatic float closes the air intake pipe in the event of flooding, air within the motor housing then sufficing to maintain operation till the normal intake is pumped clear again. The craft is self-righting and, to prevent its running away, in the event of the crew being thrown out, ignition is interrupted automatically when a certain deflection from upright is exceeded. The whole subject some little time ago was critically analysed by Dr. Mendl, and it is interesting to note that he considers the *Aquitania's* motor lifeboats to be about the most successful design yet developed. He attaches special importance to the facility of launching provided by the fore and aft wells, but points out that the door for the wireless house in front of the cabin is a source of weakness and danger in rough weather, however well the cockpit scuppers work.

It has been suggested that access to the forward boat slings is difficult in the *Britannic's* motor boats, which represent a design intermediate between that of the *Imperator's* and *Aquitania's* boats. The determined until practical experience has been obtained and none will regret indefinite postponement thereof. Provision of sufficient seating capacity in motor lifeboats alone seems hardly practicable. Though open boats suffice for many classes of vessel, a protecting deck is very desirable on boats for large passenger steamers. It is to be hoped that the radius of action of the motor boats will be materially extended, for its present limitations make it out of the question to tow a fleet of ordinary lifeboats any considerable distance to the nearest coast or shipping lane. In the case of liners plying crowded lanes, there is, perhaps, no need to provide for long-distance towing, but many medium and small ships have to depend on help from great distances. In its present state of development, wireless telegraphy does not do a great deal to better the lot of lifeboats, for the latter can carry but a small and low aerial (and could hardly keep that in bad weather) and their range of transmission is correspondingly limited. The range of reception is greater, but still small reception without power to reply is of limited utility. On coast lifeboats conditions are reversed and reception is more important than transmission of signals.

Though capable in many respects of improvement, motor lifeboats have undoubtedly come to stay, and their advantages are so considerable as to justify the closest attention to further perfecting these craft.

GERMANY AND WIRELESS.

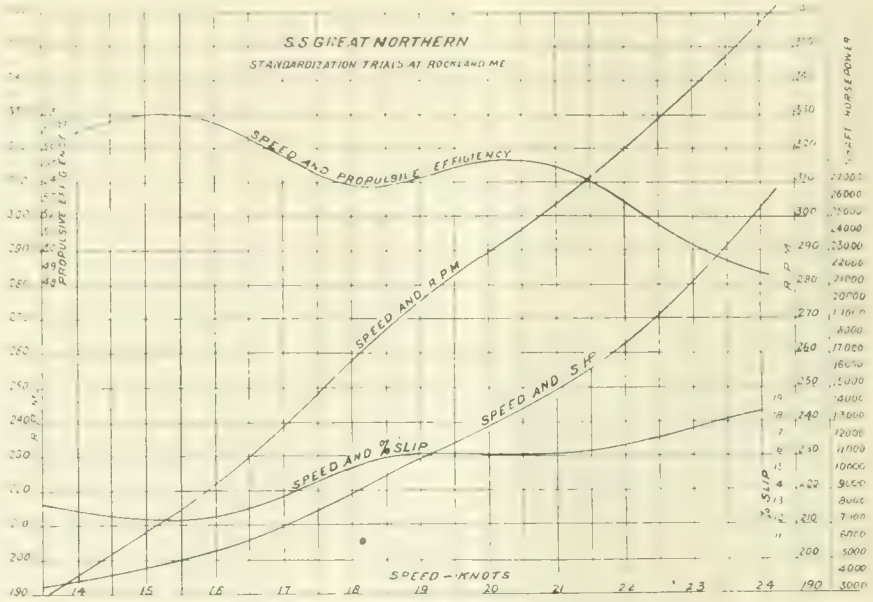
One of the favourite occupations of German hate and spleen-mongers, next to perfectly general vituperation in which the lack of restraint is only equalled by the lack of cogency, appears to be the discovery and condemnation of British monopolies of all kinds. The penalty thereof is painted in lurid colours, and it is forthwith intimated that Germany must become the monopolist. Following these general lines, Dr. N. Hansen (Berlin) dilates upon the importance of frustrating the English wireless telegraph monopoly. Of a total of 310 land stations and 1,008 ship stations recorded by the International Telegraph Union returns for 1913, Germany and her then colonies had 23 land stations, 227 mercantile and 112 warship stations, as against 44 land stations, 519 mercantile and 215 warship stations owned by Great Britain, in addition to 85 (chiefly land stations) in our colonies. These figures hardly lend striking support to the contention that we are securing monopoly, nor is the learned doctor's assertion that "many thousand words of German traffic" are opposed, presumably, to plain truths have been sent by wireless to the States and thence to South America and Asia, "to the anger of the English," compatible with the fact which he himself admits later, that we could if we wished "block" such transmission.

The writer is much disturbed over the importance which we attach to the institution of an Imperial wireless network, and he announces that "England is already much nearer a wireless monopoly than is known in Germany, particularly in the United States, where the Marconi Company owns practically all long-distance stations, the American national stations being of limited power and erected chiefly in the interests of American coastal traffic." The doctor much regrets that available information is "so incomplete and unreliable that he cannot investigate how far capitalistic and how far political influences have been at work in the existing English network"! Germany "must not neglect to provide an extensive and well secured wireless network." That, we are informed, "is important for an independent news service to all parts of the world." Finally, the hope is expressed that sufficient support will be given to the Telefunken system, "after the experience of the war, to enable it to compete capitalistically with the Marconi monopoly." To talk of our establishing a wireless monopoly over the nationals of any other country is obviously absurd, whilst the German laments over our own widespread wireless network are those of a country not possessing and not fit to administer a world Empire, yet seeking the privileges of free Imperialism.

The Arctic Sea Passage.—The Council of the Congress of Representatives of Exchanges, Trade and Industry, has submitted to the Ministry of Trade and Industry a detailed report on the question of establishing a Northern sea route via the mouths of the rivers Ob and Yenissei. In order to bring these routes into proper workable condition the Council says that it is urgent to adopt the following measures:—(1) An extension of the wireless telegraph system; (2) systematic investigation of the movement of the ice and the sea currents in the estuaries of the Northern Rivers, in the Kara Sea, and in the Straits of Novaya Zemlya: to be supplemented by hydrographic and hydrometeorological work, to continue for a series of years; (3) the equipment of the sea and river routes with directive signs and lighthouses; (4) the selection of places, even if poorly equipped, for transhipping goods from ships to river boats and *vice versa*; also the construction of quays and stores; (5) the examination and correction of the bar of the River Ob, and the fairway of the River Yenissei, so that sea-going ships may reach the town of Yenisseisk, which is 2,000 versts from the mouth of the river, &c.

SS.s. "GREAT NORTHERN" AND "NORTHERN PACIFIC."

In our issue of February 11 we gave some particulars relating to the two passenger steamers, *Great Northern* and *Northern Pacific*, which the William Cramp & Sons' Ship & Engine Building Company, Philadelphia, built for the Spokane, Portland & Seattle Railway Company to run between the mouth of the Columbia River and San Francisco. The distance is 525 miles, and the idea is to make the journey one of 24 hours. In the recent issue of the Journal of the American Society of Naval Engineers, Mr. W. B. Robins gives some interesting particulars of the trial runs of the steamers. The hull is built on fine lines and the speed at which the vessels are to run ordinarily is 23 knots. The passenger accommodation is for 856 persons, and in order to secure some 25,000 h.p. without extending unduly the machinery space it was decided to install a three-shaft Parsons turbine arrangement together with specially designed watertube boilers.



Trial Data of the "Great Northern."

The following data is given by Mr. Robins:—

HULL.

Length, overall	521 ft.
,, between perpendiculars	500 ft.
Beam	68 ft.
Depth, moulded to A deck	50 ft. 3 in.
Draught, full load	21 ft.
Displacement	9,700 tons.
Deadweight carrying capacity	2,185 ,,
Gross tonnage	8,255 ,,
Capacity of fuel oil compartments	1,200 ,,
,, reserve feed tank	112 ,,
,, drinking water tanks	12 ,,
Passengers, first-class	550
,, second class	108
,, third class	198
Total	856
Crew	148
Total persons on board	1,004

MACHINERY.

Shaft horsepower, designed	22,000.
Revolutions per minute, designed	350.
Speed of ship, designed	23 knots.
H.P. turbine, number of	1.
,, length, overall	21 ft. 7 in.
,, diameter of rotor drum	5 ft. 8 in.
,, number of stages	4.
L.P. and astern turbines:—	
Number of	2.
Length, overall	12 ft. 3 in.
Diameter of rotor drum, l.p.	7 ft. 8 in.
,, ,, astern	6 ft. 7 in.
Number of stages, l.p.	6.
,, ,, ,, astern	4.

Diameter of line shafting	12¼ in.
Propellers, solid manganese bronze, number of .	3.
,, number of blades, each	3.
,, diameter .	9 ft. 2 in.
,, pitch	8 ft. 4 in.
Main condensers, number of	2.
,, cooling surface, each .	13,046 sq. ft.
,, ,, total . .	26,092 sq. ft.
,, number of tubes, each . .	6,018.
,, diameter of tubes	0·¾ in.
,, thickness of tubes, B.W.G.	16.
Boilers, number of	12.
,, width overall . ..	15 ft. 7⅜ in.
,, length overall	11 ft. 8⅞ in.
,, height over steam drum . .	14 ft. 2½ in.
,, diameter of steam drum .	54 in.
,, number of tubes, each...	969.
,, diameter of tubes	2 in.
,, thickness of tubes, B.W.G.	9.
,, heating surface, each	5,000 sq. ft.
,, ,, ,, total	60,000 sq. ft.
,, working pressure	220 lb.

The German Battleship "Deutschland," one of which Type was Sunk by Russia in the Baltic last week.
(*See page* 26.)

The turbines are the Parsons type, arranged on three shafts, one high-pressure on the centre shaft and one combined low-pressure and astern on each wing shaft. Lubrication of the turbine and main shaft bearings is by a gravity system. A tank of about 2,000 gall. capacity is placed at a height which gives a pressure at the bearings of about 10 lb. per sq. in. After the oil has passed through the bearings it flows to drain tanks from which it is returned to the gravity tank by two steam pumps, two coolers being fitted to lower the temperature of the oil.

The boilers are of the Mosher type, built by the Babcock & Wilcox Company, and are arranged in two compartments, six in each. The boilers are all set facing the centre of the ship, leaving a firing space along the centre line 11 ft. 2½ in. wide from front to front of boilers. The total space occupied by the boilers is 130 ft. by 41 ft. 6 in. At the forward end of the forward stokehold there is a donkey boiler 5 ft. 9 in. diam., and 10 ft. 7¾ in. long. The boilers use oil fuel, and operate under forced draught. The Koerting mechanical oil-burning system, made by the Schutte & Koerting Company, Philadelphia, Pa., is used. The principal features of this system are forcing the oil under high-pressure through heaters and atomising it mechanically in centrifugal spray-type burners without the use of steam or air as an atomising agent, the air for combustion being furnished from the forced-draught pressure in the fire-room through an adjustable air register at each burner.

There are two smoke stacks, about 112 ft. high above the base line. The Pioneer smoke indicator system is installed, which enables the density of smoke passing up the stacks to be determined in the stokehold. This system consists of an electric light in each smoke stack shining through a lens on to a selenium cell on the opposite side of the stack. The selenium cell is in an electric circuit, and a variation in the intensity of the light changes the conductivity of the selenium, causing a variation in the current, this variation showing on an indicator in the fireroom. The forced draught is operated on the closed-stokehold system, three 34-in. high-speed turbine-driven cone fans being fitted for each stokehold. These fans were made by the B. F. Sturtevant Company, and have a capacity of 30,000 cubic ft. of air per minute against a pressure of 2 in. of water.

There are two 48-in. Reilly multicoil feed-water heaters, each having a capacity of 150,000 lb. of water per hour with a discharge temperature of 208° Fahr., with steam at 5 lb. pressure. There is also a Reilly multicoil navy type evaporator, having a capacity of 25 tons of fresh water per 24 hours.

The contract required the following :—

(*a*) A progressive standardisation trial over the measured mile to standardise the propellers.

(*b*) A 12-hour trial at 20 knots; the revolutions to be taken

from the revolution curve obtained by [illegible], and further, on this trial 10 of the 12 boilers shall be in use, and four of the six forced draught fans.

The *Great Northern* was the first vessel ready for trial. It was decided to standardise over the measured mile at Rockland, Maine. The standardisation trial was conducted in December last, and the curve reproduced on page 28 obtained. Immediately after the three high speed runs, the vessel began her 12 hour, 23 knot run. The speed was easily maintained and the performance of the machinery was excellent. [illegible] to Rockland, the *Great Northern* encountered a heavy north east gale, and the owners were given an opportunity to ascertain her sea going qualities. Accordingly the vessel was run at various speeds, up to full speed, with a head sea on the quarter. The maximum pitch was 4 to 5 deg., and the maximum average roll 18 to 20 deg. The vessel was remarkably steady and very dry forward.

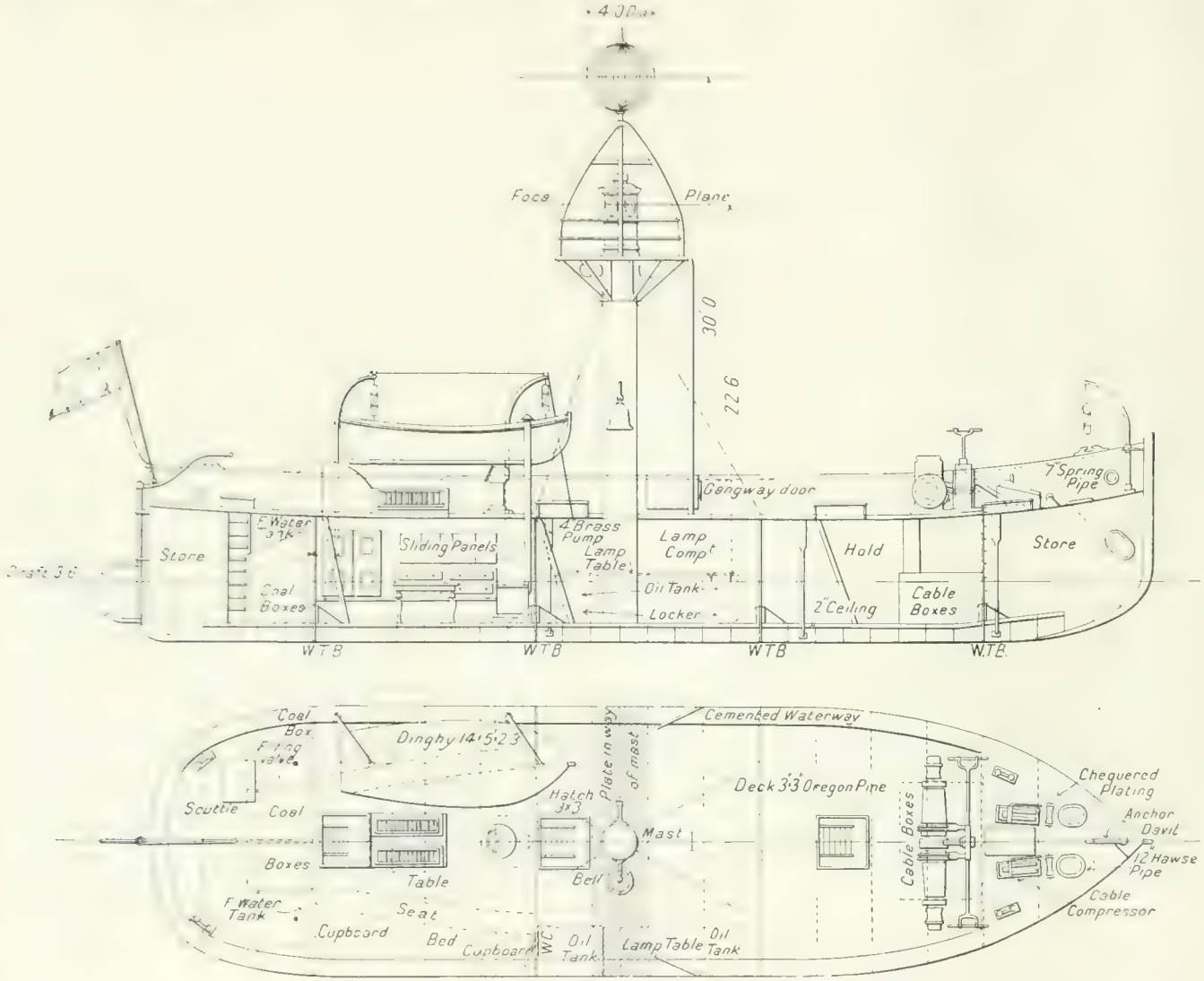
The *Northern Pacific* underwent her trials in February, 1915, and her performance was satisfactory. Her average speed was slightly higher.

One of the most excellent qualities of these vessels is the entire absence of vibration at high speed in the passenger quarters. There is only a slight vibration over the propellers.

In the engine design of the vessel there are several noteworthy ideas. The arrangement in the engine room and stokeholds is par-excellent. In the engine room it is possible to stand on the throttle platform and observe the operation of every piece of auxiliary machinery. This feature is extremely valuable to merchant service, where the maximum results must be obtained from the minimum cost.

The arrangement of the oil coolers under the sanitary pumps, the foundations for the pumps being cast with the cooler castings, and the water passing through them to the sanitary system, are instances of what can be saved in weight and space with a gain in efficiency.

The turbine forced lubrication system is about the same as the standard Parsons system, except the pressure is maintained by the height of the supply tank in the engine-room hatch. There is an oil-level sight glass on the working platform and also a float in the



General arrangement of the new Lightships built for the Humber Conservancy Board by J. S. Watson, Gainsborough.

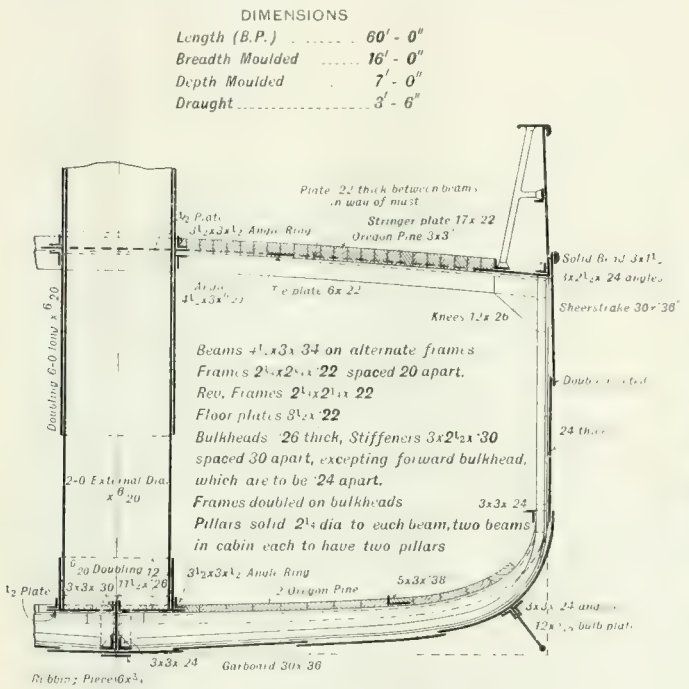
The author calls attention to the following two features in the boilers: (1) The feed is introduced into the lower or mud drum, and the burners are under this drum. (2) The air is admitted in two ways: first, from the back of the boiler, down, and under the boiler floor and up to the burners in front, and also through doors at the front. This resulted in the boiler casings being remarkably cool.

In the stern-tube lubrication the Vickers oil-packed stern-tube is used. This system has been in use for some time on Channel steamers in Great Britain.

tank, so that as soon as the oil drops to a low level a large 12-in. gong sounds. This prevents, by any chance, the oil level getting low. The oil is returned to the tank by a pump automatically controlled by a pressure governor of the Ideal make.

TWO NEW LIGHTSHIPS FOR THE HUMBER CONSERVANCY BOARD.

The accompanying drawings and illustration show two steel lightships 60 ft. by 16 ft. by 7 ft. recently built by Messrs. J. S. Watson, Gainsborough, for the service of the Humber Conservancy Board, Hull, the vessels being constructed under Lloyd's survey for Classification 100A and under the superintendence of Mr. Arthur E. Butterfield, M.Inst.C.E., M.I.N.A., the Engineer to the Board, who designed the craft for the special requirements of the Humber. Each vessel has four watertight bulkheads, is fitted with a comfortable cabin for two men, and has compartments for fresh water, stores, lamp room and cable. A very powerful hand windlass is fitted forward specially strengthened for use with the large chain


DIMENSIONS
Length (B.P.) . . . . . 60′ - 0″
Breadth Moulded . . . . . 16′ - 0″
Depth Moulded . . . 7′ - 0″
Draught . . . . . 3′ - 6″
Plate 22 thick between beams in way of mast
Stringer plate 17 x 22
Oregon Pine 3x3
Knees 12x 26
Sheerstrake 30 x 36
Beams 4½x3x 34 on alternate frames
Frames 2½x2½x 22 spaced 20 apart.
Rev. Frames 2½x2½x 22
Floor plates 8½x 22
Bulkheads 26 thick, Stiffeners 3x2½x 30 spaced 30 apart, excepting forward bulkhead, which are to be 24 apart.
Frames doubled on bulkheads
Pillars solid 2¼ dia to each beam, two beams in cabin each to have two pillars
3x3x 24
Garboard 30x 36

Humber Lightship. Half Section.

used on craft of this type. The decks are of Oregon pine and a large teak companion and skylight is fitted over the cabin.

The optical apparatus, which was supplied by Messrs. Chance Bros. & Co., Ltd., of Birmingham, stands on a steel platform on the top of a welded steel mast 2 ft. in diam. being specially made to the requirements of the Engineer to the Board.

LOCKING ARRANGEMENTS AT GATUN.

The following procedure has been adopted relative to the locking of ships at Gatun, and the working force at Gatun has been so arranged that vessels will be locked on arrival, with exceptions noted below, beginning at 8 a.m., preferably with southbound ships, *i.e.*, those bound from the Atlantic to the Pacific.

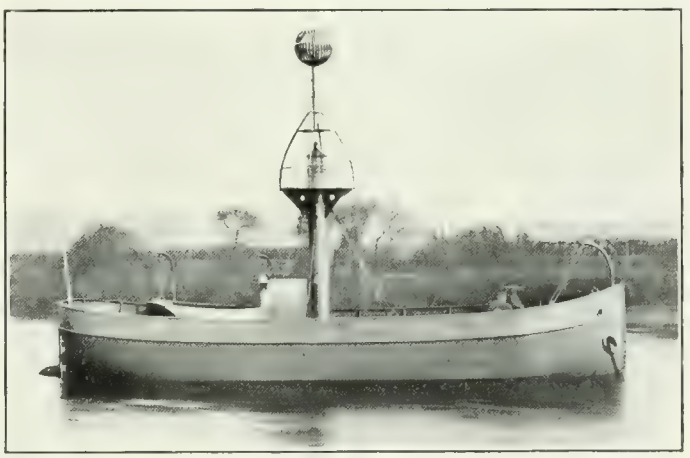
North-bound ships arriving in the afternoon will be locked as they arrive, and the pilots will maintain their sequence in the channel, except that a faster vessel is permitted to pass a slower in Gatun Lake, if safety allows, and thereby change her sequence number. If the vessel whose sequence entitles her to enter the locks first does not get under way within 15 minutes of receiving the arrow signal on the approach wall to advance for lockage, the next ship on turn may proceed and the first will lose one turn.

If there are a number of north-bound ships in any afternoon, and more desire to dock at Cristobal than berths are available for, the one or ones which need not be locked down in the afternoon will anchor in the basin in Gatun Lake, to proceed to Cristobal early the next morning. But if the ships are bound for sea or to available docks, all will be locked down in the evening of arrival at Gatun Locks.

By a readjustment of the locks force, operations are carried on till 11 p.m. The new arrangement assures prompt despatching, and with the coaling operations carried on at Cristobal by night it is possible for vessels to reach Gatun, north-bound, at 7 in the evening, lock down, coal at Cristobal, and put to sea before day.

A TOUGH PROPOSITION FOR THE GERMANS.

One of the most interesting repair jobs in hand is that which is being carried out by Messrs. Swan, Hunter & Wigham Richardson, Ltd., to the ss. *Delmira*. This vessel, owned by Messrs. Bicket & Co., of Liverpool, was going down the Channel on a voyage from Boulogne to Port Talbot, on March 24 last, when, at about 7.30 a.m., a German submarine was sighted some distance astern. The captain of the *Delmira* ordered full steam ahead, and an exciting chase ensued, the *Delmira* endeavouring to evade the submarine for nearly an hour. By this time the submarine had got at close quarters and, commencing firing shots at the *Delmira*, damaging



View of one of the New Lightships for the Humber Conservancy Board, built by J. S. Watson, Gainsborough.

the deckwork, &c., and demanding her to surrender, and finding it impossible to escape the *Delmira's* crew got into the boats and left the ship. The Germans then went on board the vessel and placed a bomb under the forecastle, which set the forward end of the vessel on fire. The submarine then discharged a torpedo, which struck the vessel in the engine room on the starboard side, blowing a big hole in the shell and seriously damaging the machinery, but still the vessel did not sink. The Germans then left the *Delmira* and towed the three boats containing the crew towards the English coast for an hour and a half, until they sighted the ss. *Lizzie*, when the submarine left, and the crew were taken on board the *Lizzie* and landed at Sandown Bay, in the Isle of Wight. Meanwhile, the *Delmira* was drifting helplessly in the Channel, the fore end burning furiously, and in this condition was sighted by a British destroyer, which came up with her, and, considering her a danger to navigation, put some shots into her with the intention of sinking the vessel. The ship still remained afloat, and she eventually drifted ashore on the French coast about 10 miles from Cherbourg and sustained heavy bottom damage. The French naval authorities extinguished the fire and towed the *Delmira* to Cherbourg, where she was dry-docked and a large shield fitted over the hole in the engine room, made by the torpedo. After this was completed the vessel was then towed to Sunderland, all the machinery was removed to be re-constructed by the engine builders—Messrs. George Clark, Ltd.—and the ship herself was towed round to the Tyne to have the other repairs executed at the dry docks department at the Wallsend shipyard.

The *Delmira* was built by Messrs. Short Bros., Sunderland, in 1905.

LIGHTHOUSE FOR CAPE MALA.

An expedition for the erection of the new light on Cape Mala at the western point of the Gulf of Panama left Balboa, June 3, equipped with all requisite supplies and under orders to complete the light and start it burning. According to the *Canal Record*, about a month will be required for the fulfillment of the mission. The Cape Mala light will mark the entrance to the Gulf of Panama, around the point which has come to be called "Bad Cape" (*Punta Mala*). Cape Mala is situated about 95 miles from Balboa.

The work of the expedition will be the erection on the concrete foundations of the 100-ft. tower and light complete, and the erection of a tank's house for the storage of gas containers, and a cottage to quarter the keeper of the light. The tower and lamp were assembled complete at the works of the contractor prior to shipment, and all the parts numbered, so that the erection at Cape Mala will be a relatively simple task of reassembling.

The erection of the light on Cape Mala will meet a need which has been felt for many years. Since the middle of the last century, at the time of the California gold rush, when traffic through the Gulf of Panama was greatly stimulated, complaints and recommendations have been made by mariners in the hope of having a light established at this point, and experienced navigators of the west coast have emphasised the need.

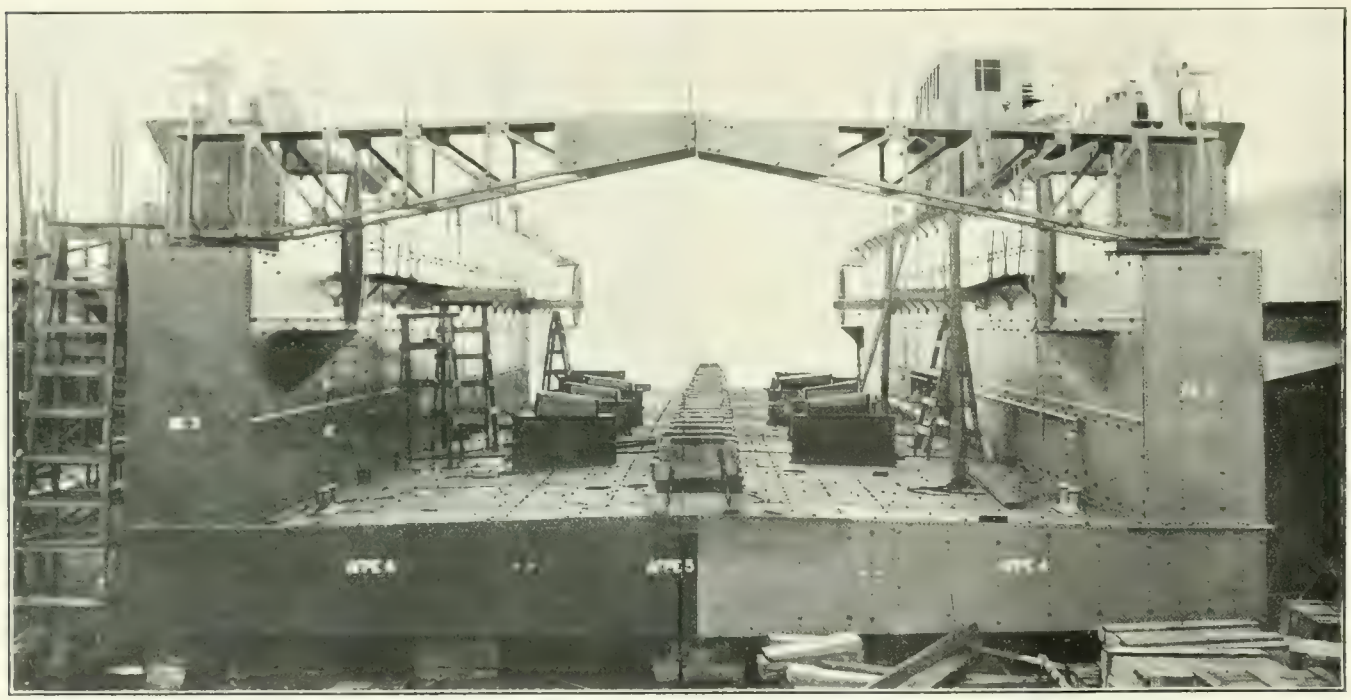
It will enable mariners to find their position when making the Gulf of Panama, from either the northward or the southward, since the coast in the vicinity of Cape Mala is low, difficult to see, and devoid of any distinguishing features; besides which, there are dangerous outlying reefs and varying currents, which sometimes reach a velocity of 1½ knots an hour.

When once a vessel has found her position off Cape Mala, the light, in conjunction with the Bona Island and Taboguilla Island lights, which will be established at about the same time, will simplify navigation of the Gulf so that a vessel should easily find her way up to the entrance to the Canal. Coupled with the fact that vessels may find a good anchorage anywhere after passing Bona Island, and that there is rarely, if ever, any seriously heavy weather in this vicinity, navigation will be rendered simple and with the usual precautions can be accomplished in safety.

The original scheme for the aids to navigation in the Gulf contemplated the establishment of a light on a high point in the Pearl Islands, but since the opening of the Canal it has been demonstrated that there is no need of one there. Ships would rarely, if ever, go so far out of the course and even if they should the islands are high and easily visible, with no outlying dangers on the south-westerly side.

FLOATING DOCK FOR ANTOFAGASTA.

The accompanying illustration represents a floating dock which has been recently built by Messrs. Hawthorns & Co., Ltd., Leith, to the order of the Antofagasta (Chili) & Bolivia Railway Company, Ltd., for use in connection with their floating stock at Mejillones, Chili, under the superintendence of Messrs. John Crookston & Son.



Floating Dock built by Hawthorns & Co., Ltd., Leith, for the Antofagasta (Chili) & Bolivia Railway Co., Ltd., for use at Mejillones.

The dock has been constructed on the self-docking principle, consisting of four pontoons connected to each other by two sidewalls, and is capable of lifting vessels up to 400 tons displacement.

Two 12-in. pumps of the horizontal centrifugal vertical-spindle type, by Messrs. Henry Watson & Co., Ltd., were supplied, each pump being capable of lifting 400 tons in two hours, or, together, of doing the work in one hour. The pumps are driven by two vertical direct-current shunt-wound semi-enclosed type motors of 24 h.p. at 500 r.p.m., by Messrs. Clarke, Chapman & Co.

The principal dimensions are as follows:—

Length overall	130 ft.
Breadth over sidewalls	52 ft.
Depth of pontoons at centre	5 ft. 6 in.
Height of pontoons at inside of sidewall above base	5 ft.
Breadth of sidewalls at top of pontoon	5 ft. 6 in.
,, ,, at deck	5 ft. 6 in.
Height of sidewalls above pontoon deck, about	18 ft. 6 in.
,, ,, from bottom of pontoon at side	23 ft. 6 in.
Draught of vessel to be docked	11 ft. 5 in.
Freeboard of sidewall when docking a vessel of 11-ft. 5-in. draught	3 ft. 5 in.
Freeboard of pontoon when loaded with a vessel of ten tons displacement	3 in.
Height of keel blocks to top of cap pieces	3 ft. 6 in.
Time of lift	1 hour.

GENERAL NEWS SECTION.

PERSONAL.

Mr. Charles Nicholson, head of the Corinthian Steamship Company, has died at Southport at the age of 60 years.

The late Mr. William Balls, of Percy Gardens, Tynemouth, formerly head of Messrs. W. D. C. Balls & Son, shipowners, of North Shields, left £71,907 gross.

At the end of last week Mr. Frederick Alcock retired from the position of General Manager of the Pacific Steam Navigation Company, and also the direction of the Royal Mail Steam Packet Company's agency in Liverpool. His many friends in the world of shipping will regret to learn that Mr. Alcock has been compelled to

Mr. Frederick Alcock, F.R.G.S.,
Late General Manager, Pacific Steam Navigation Company.

take this step owing to failing health. Mr. Alcock, besides directing the affairs of these huge concerns, has influenced the development of trade with the East and West Coast of South America in other ways. He has been chairman of the Magellan Conference of South American Steamship Lines since it was formed in October, 1904, and he was also, in 1897, founder of the Brazil & River Plate Passenger Conferences, which are, though in an abridged state owing to the retiral of the German lines, going on at the present time. Mr. Alcock has been a great traveller, is a Fellow of the Royal Geographical Society, and is the patentee of a quick and safety ladder for access to ships' holds. He has been succeeded in his important position at Liverpool by Mr. R. R. Lamb, who has long been in the service of the company.

We learn that Captain J. S. Davidson, son of Mr. S. C. Davidson, Sirocco Engineering Works, Belfast, is to be Brigade Captain for the machine gun section of his regiment, the 12th Battalion Royal Irish Rifles (1st Batatlion Co. Down Volunteers).

The death is announced of Mr. Ernest Pilling, senior partner in the firm of Waldemar, Brandt & Co., shipbrokers and coal exporters, Sunderland. Mr. Pilling, who was in his 41st year, was born at Gourock, and entered the firm of which he subsequently became principal partner 21 years ago.

Owing to health considerations, Mr. H. Wilson Holman has retired from Messrs. C. M. Burls & Partners, consulting engineers and surveyors, 4, Lloyd's Avenue, London, E.C., who have now taken Mr. S. G. Gordon into partnership, and the firm will in future be carried on under the name of C. M. Burls, Gordon & Partners.

Mr. Hugh L. Roxburgh, who has been elected a member of the Mersey Docks and Harbour Board in succession to the late Mr. Danson Cunningham, is a partner in the firm of Messrs. John Rew & Co., is President of the Liverpool Cotton Association, and he was the nominee for the position of the cotton trade, as was his predecessor.

The interment took place at Carnmoney, Belfast, on Tuesday, 6th inst., of Engineer-Commander Hugh Todd, R.N.R., who died at Inverness on 3rd inst. He was a well-known figure in Belfast engineering circles, having, prior to the war, been in the service of Workman, Clark & Co., Ltd.; previous to this he was a chief engineer on the Head Line steamers.

The retirement is announced of Captain H. J. Henderson, who has been in the service of the Great Eastern Railway Company 34 years. Captain Henderson entered the Great Eastern Railway Company's service in October, 1881, at Harwich, and in 1888 he was sent to Lowestoft as Assistant Harbourmaster, and in June of the following year was made Harbourmaster, a position which he has held during the past 26 years. He is succeeded by Captain Gwilliam.

We regret to hear of the death of Mr. Thomas Hope Robinson, who was the founder, proprietor and up to about three years ago Editor of our contemporary *Fairplay*. Mr. Robinson was one of the best-known figures in shipping circles and conducted his editorial policy in vigorous style begotten of an intimate acquaintance with maritime affairs. He was in his 87th year and up to quite recently rode with the hounds, like the keen sportsman he always was.

A new building has been secured for the establishment of a National Shell Factory in the Cardiff (central) area of South Wales. In addition to this factory all the engineering firms in the district are to co-operate and already machines are being placed in the factory. The Central District Committee consists of Principal Griffiths (of the University College, Cardiff), Chairman; Mr. W. H. Diamond (T. Diamond & Co.), Vice-Chairman; with about 20 members; and Mr. David E. Roberts, 59, Queen Street, Cardiff, Hon. Secretary. The Board of Management to deal with the equipment of the factory and the handling of the co-operative scheme includes Mr. Wm. Graham (Messrs. C. H. Bailey & Co.), Mr. John Elliot (Messrs. Elliot & Jeffrey), Mr. C. A. James (Representative, Amalgamated Society of Engineers), and Mr. D. E. Roberts, M.Inst.C.E. (Consulting Engineer). The manager of the factory is Mr. James Hindmarsh, M.Sc., Consulting and Marine Engineer.

At the offices of the Trechmann Steamship Company, Ltd., Captain Thomas Martin, of the ss. *Hartdale*, was, last week, presented with a valuable gold watch with inscription by the Lords Commissioners of the Admiralty, and with a letter on vellum, to the following effect:—"The Lords Commissioners of the Admiralty are pleased to express to you their marked approbation of the manner in which you carried out your duty, when attacked by a German submarine on March 13, 1915.—By command of their Lordships, W. Graham Greene." Captain Thomas Martin was also presented with a heavy gold albert by the directors of the North of England Protecting and Indemnity Association (War Risks) and a cheque for 100 guineas from his owners for his courageous behaviour when his vessel was sunk by a German torpedo on March 13 off So. Rock Light, County Down. The chief mate, Mr. W. Bottomley, of South Shields, was also presented with a gold watch by the Lords Commissioners of the Admiralty.

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(From Our Own Correspondent.)

Glasgow.

The figures relating to the output of mercantile tonnage from Scottish shipyards during the half-year which has just closed, though of little value for comparative purposes owing to the new conditions brought about by the war, are nevertheless interesting because they show the amount of mercantile work done in a certain number of yards which are not exclusively given over to Government work. The total output on the Clyde since the beginning of the year consists of 50 vessels of about 139,000 tons gross, compared with 129 vessels of about 267,700 tons in the corresponding period of last year. This is a decrease of 79 vessels and of about 128,700 tons during the past half-year. On the east of Scotland the output for the six months consisted of 8 vessels of 5,150 tons launched on the Firth of Forth, 5 vessels of 2,740 tons on the Tay, and 22 vessels of 4,100 tons at Aberdeen and on the Moray Firth coast. The output on the Clyde for June, though only about half of that of a normal year, is considerably larger than that of the previous two months. It included four fairly large cargo steamers, a coasting steamer, a dredger, a tug, and some smaller craft, making a total of nearly 20,000 tons in all.

Holidays in the Shipyards.

The shipyard holidays at Greenock and Port Glasgow are now over and work has been resumed again in all the yards. In normal years the men have taken from 9 to 10 working days off, but this year the time allowed was only about 4½ working days, or 6 days including Sunday and a half-day on Saturday. On the lower reaches of the river the men have as a rule loyally followed the Admiralty instructions as to holidays, and no doubt a similar course will be followed in the Glasgow district where the holidays begin on Wednesday next and extend for 4½ working days. All arrangements have been made by the Admiralty for a prompt resumption of work at the close of that period.

The Cart Navigation Trust.

The Town Council of Paisley has decided to give effect to the decision of the Court of Session and to resuscitate the Cart Navigation Trust. As explained in your columns last week, the Trust practically ceased to exist, so far as the active management of the River Cart was concerned, when the undertaking passed under the control of a judicial factor. That official has now been relieved of his duties by order of the Court of Session, and the Paisley Town Council has been obliged to take steps for the appointment of Trustees. Six Trustees will be appointed by the Town Council, three by the traders in Paisley and district, and probably three representatives will be nominated by the bondholders.

Steel Prices Hardening.

Although no official change has been made in the nominal selling price of steel, Scottish steel manufacturers, at a meeting held recently, decided to reduce the amount of discount allowed for home delivery. Hitherto manufacturers have allowed a discount of 5 per cent. on their quoted prices. In order to fall into line with manufacturers in other steel-making districts, they have now decided to allow a discount of only 2½ per cent. The change came into force on the first day of the current month. At present ship plates are nominally £9 15s. for export and £10 per ton for home delivery, and prices tend to harden still further.

THE NORTH-EAST COAST.

(From Our Own Correspondent.)

Newcastle-on-Tyne.

There is very little change in the shipbuilding, ship-repairing and allied industries as compared with any period during the past three months, and no better proof of the declining volume of the output of commercial tonnage on Wearside can be given than the figures for the past half year so far as the Tyne and Wear shipyards are concerned. During the month of June, 4 vessels were launched on the Tyne, as against 5 vessels launched in June, 1914, whilst during the past half-year 50 vessels were launched as against 42 in the first six months of 1914. At Sunderland, the position is entirely different, as during last month only 2 vessels (the ss. *Alice Marie*, 2,200 tons, building by Messrs. S. P. Austin & Sons, Ltd., and the ss. *Foyle*, 4,700 tons, building by Messrs. J. L. Thompson & Son, Ltd.) were launched, and for the half-year only 20 vessels of 68,965 tons were launched from Wearside yards, as compared with 37 vessels of 149,781 tons launched during the similar period of last year. Ship-repairing is only fairly brisk, and not all of the graving docks are in regular employment. There is no change in the manufactured iron and steel trades, although increasing orders for Government account were last week placed at Middlesbrough, and for other business only deliveries for indefinite dates are being offered.

Dock Improvements at West Hartlepool.

Despite the shortage of labour, and other delays consequent upon the war, fair progress continues to be made by the engineering department of the North-Eastern Railway Company in the widening and deepening of the entrance leading from the old harbour to the north basin, and thence to the central dock at West Hartlepool. These new entrances will be of an improved formation and will have a width of 70 ft., as against 60 ft. originally. The contract for the three pairs of gates was originally placed with the Gutehoffnungshutte Company, of Oberhausen, Rhineland, but shortly after the outbreak of war was diverted to the engine works department of Sir W. G. Armstrong, Whitworth & Co., Ltd., of Newcastle-on-Tyne, and a commencement has already been made with their erection at the site. The hydraulic sluice and dock gate machinery for these entrances is being constructed according to Norfolk's patents, by the Hydraulic Engineering Company, Ltd., of Chester, whilst the manufacture of the roller path is in the hands of Messrs. Glenfield & Kennedy, Ltd., of Kilmarnock.

MERSEY SHIPPING AND SHIPBUILDING.

(From Our Own Correspondent.)

Liverpool.

Official figures are now available which bear out what has been stated in this journal that notwithstanding the activity and congestion at the Liverpool docks, coupled with the diverting of many steamers to the Mersey port owing to the war, the actual traffic dealt with during the last 12 months has been less than in normal times. The annual traffic statement of the Mersey Docks & Harbour Board for the 12 months ended June 30 shows a decrease of 2,194 ships and 105,759 tons; the actual number of vessels entering the port being 22,562, of 18,980,913 tons, against 24,756 ships and 19,086,672 tons in the previous 12 months. This being the net register tonnage of ships inward, the total tonnage using the port inward and outward for the year just ended is therefore 37,961,826 tons.

Owing to increased income from graving docks and dock rent, &c., the grand total of the Board's revenue from all sources has, however, exceeded last year's total by £5,613, the figures being £1,684,219 against £1,678,606.

In connection with the announcement made that Sunday last was the 75th anniversary of the Cunard Company's entry into the Atlantic trade, it will be of interest to add that Tuesday this week was also the 100th anniversary of the inauguration on July 6, 1815, of the first steamboat service on the Mersey, that is, between Liverpool, Ellesmere Port and Runcorn.

SOUTH WALES NOTES.

(From Our Own Correspondent.)

Cardiff.

Mr. George Gunning, Secretary of the Sailors' & Firemen's Union at Swansea, in a review of the work of seamen during the war, makes some interesting remarks. On the declaration of war, he says, a large number of seamen who were members of the Royal Naval Reserve were called up, and in all corners of the globe Reserve men on merchant ships were collected by British Consuls and naval ships and sent to their various depôts. Swansea alone had 1,400 in the ranks of the Naval Reserve. This, together with the fact that thousands of enemy seamen were interned, caused a serious shortage of men, and with freights 50 per cent. up a move was made by the seamen towards a rise in wages, and shipowners granted an advance of 10s. per month. So acute did the shortage of men become that cases had been known of masters bidding for men to complete crews. The comments of Mr. Gunning while pointing out the effect of the war on the calling of seamen also emphasise the difficulties with which owners have had to contend and also the fact that increased cost of labour, &c., is swallowing up a goodly proportion of the higher freights ruling since the outbreak of war.

Ship Repairing.

A fair amount of activity continues in Welsh ship repairing circles, but while some companies are working at full pressure others are only fairly active, work being somewhat irregularly placed. The question of obtaining sufficient labour to cope with the work in hand is still a source of anxiety to employers, and the call for skilled workers for the munition factories will certainly not diminish employers' difficulties in this respect despite the announcement that men already engaged on war work should not avail themselves of the opportunity of helping the country. The question as to whether dry-dock workers can be classified as working on war contracts is open to dispute inasmuch as while many of the boats undergoing repairs are Admiralty transports others, including neutral-owned tonnage, are only engaged on ordinary commerce. The latter, however, are doing indispensable work in bringing supplies of food and raw material to this country, and therefore are as important to the nation as Admiralty transports. Thus it is likely that dry-dock workers will be classified as "engaged on war contracts." Already many of the dry-dock employees have volunteered to work in the munition factories, particularly boilermakers, who, by the way, are in heavy demand, plating work in the district being abundant. At Cardiff the Bute Shipbuilding & Engineering Company, Ltd., have just taken in hand the Greek steamer *Gerasimos* for heavy damage repairs. The vessel which has been docked with her cargo on board was a few weeks ago in collision with the Greek steamer *Theofano Siderides*, which is being repaired by the Mercantile Pontoon Company, Ltd., and received such damage that it is necessary to supply her with a new stem bar and about 25 bow plates. The Cardiff Channel Dry Docks & Pontoon Company, Ltd., are carrying out engine repairs to the steamer *Cairnnevis*, while the Cardiff Junction Dry Dock & Engineering Company are repairing bottom damage to the steamer *Sorland*. Messrs. T. Diamond & Co., in addition to surveying the steamer *Canford Chine*, have a big boiler job on the steamer *Gafsa*, extensive shell and stem repairs to the steamer *Westborough*, boiler and general work on the steamer *Asimina*, and survey work on the steamer *Boyne*. Messrs. Elliot & Jeffery are renewing six furnaces on the steamer *Madeliene* in addition to bottom repairs, besides boiler repairs to the steamer *Pandelis*, sundry work on the steamer *Charterhouse*, shafting and engine repairs to the steamer *Othon Stathatos*, and bottom work on the steamer *Woolston*. The Mountstuart Dry Docks Company, Ltd., are busy with extensive damage work on the steamer *Kingsway*, stem repairs to the steamers *Northwaite* and *Enidwen*, and general work on the steamers *Lady Ninian*, *Karanja* and *Bilbster*. Twenty-nine vessels are in the hands of Messrs. John Shearman & Co., including heavy damage repairs to the steamer *Clutha River*, and a big overhaul to the steamer *Wilhelmina*, and general work on the steamers *Wiltshire*, *Kaikoura*, *Tunisian*, *Hallamshire*, *Carmarthenshire*, and *Strathlorne*. The Barry Graving Dock & Engineering Company, Ltd., have lifted and replaced the engines of the steamer *Lord Antrim*, and completed general repairs to the steamers *Novington*, *Kilsyth* and *Boscawen*, besides changing the propellors of the steamer *Rathlin Head*. At Swansea Messrs. Harris Bros., Ltd., are still engaged with bottom damage to the steamer *Stamfordham*, while the *Belle of the Usk* and *Talbot* are being repaired afloat, the former with stern damage and the latter bulwark damage. The Prince of Wales Dry Docks Company are repairing bottom damage to the steamer *Turnwell*, and the Ocean Dry Dock Company are carrying out machinery repairs to the steamer *Seirstad*.

BELFAST SHIPPING AND SHIPBUILDING

(From Our Own Correspondent.)

Belfast.

The Belfast shipyards and marine engineering works close down for their annual holiday on Friday evening, July 9. A change has been made in the original arrangements by which the holiday will be somewhat longer than first intended. The yards will be reopened on Friday, the 16th instant, by Messrs. Workman, Clark & Co., and on Saturday, the 17th instant, by Messrs. Harland & Wolff, but except in the case of very urgent work it is unlikely that the bulk of the men will return before Monday, the 19th instant. The men have been working under high pressure for many months, and the decision to give a substantial holiday will, it is believed, have the best results. If sudden work of a pressing nature should arrive during the holiday the men are quite willing to return to carry it out. They appreciate being on Government work as it gives them a feeling that they are doing something for their country. This feeling is very widespsread among the men, and it is producing very good results.

Output of Munitions.

The Belfast shipbuilding and engineering firms are taking a very prominent part in the munitions campaign locally. The speakers at last week's public meeting under the auspices of the Belfast and North of Ireland Employers' War Munitions Committee, included Mr. Geo. S. Clark, D.L., and Mr. Geo. Cuming, of Messrs. Harland & Wolff's. Mr. Clark said that his firm (Workman, Clark & Co., Ltd.) was prepared to do its utmost. He expressed the opinion that no compulsory powers would be needed as far as Belfast was concerned, because employers and workmen alike did not require compulsion to do their duty towards the Empire. Mr. Cuming said that his firm could not do as much as might be expected as the whole place was engaged in turning out work for the Admiralty and had been working day and night practically since the war broke out. They willingly promised that they would assist with both men and plant employed on other than Government work, and if anyone required information or advice he would give it. Mr. S. C. Davidson, of the Sirocco Engineering Works, gave an account of the formation of the Committee, and his interview, in company with Mr. Clark, with Mr. Lloyd George. He mentioned that in a letter he had received from the President of the Association of Chambers of Commerce in London it was stated that it had been said that there was no use asking Belfast to form a Munitions Committee, as the people there were doing all they could and need not be troubled about the matter.

Drawings and samples of shells, grenades, &c., were on exhibit at the meeting, and already a considerable amount of munitions has been produced in the city.

Little Merchant Work.

The production of merchant work from the yards is receding more and more into the background. Messrs. Workman, Clark & Co. hope to get the Tropical Fruit Steamship Company's new steamer *San Mateo*, launched two and a-half months ago, away to-morrow (Friday), to be followed later on by the *San Pablo*, now finishing at the Milewater Wharf. These vessels are registered under the American flag instead of at Glasgow as formerly, New York being the port to which they will belong. They are the first of a number for the same ownership, but the construction of the remainder has been delayed by the demand for labour on more urgent work which the builders have on hand. The mercantile output of the Belfast yards for the six months ended 30th ult. was the smallest for many years, consisting of four fruit-carrying vessels of moderate size, all launched by Workman, Clark & Co. Messrs. Harland & Wolff have not launched a merchant ship in Belfast this year, and have none yet in sight.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.

Perhaps not the least interesting feature in the freight markets has been the marked advance in rates for homeward business from the River Plate. At the close of last week tonnage was fixed at 61s. 3d., a striking contrast to the 45s. rate which had ruled round about a week or so earlier. This week, however, a quieter tone prevails in this market, and there is a feeling that rates may drop a bit. From Buenos Ayres the steamer *Frank Parish*, 4,000, 10 per cent., has been taken up on the other side at 58s. to United Kingdom, excluding Liverpool, with August 15th cancelling. The *Enosis*, 5,000, 10 per cent., and the *Antonio*, 4,000, 10 per cent., have been conceded 61s. 3d. from up-river ports to the United Kingdom, not north of London. They give August 20 and August 15 respectively as cancelling dates. There is little animation in time chartering. An 8,500-ton steamer has been secured at 14s. 6d. for six months' trading, United States–Australia. For vessels to engage in the United Kingdom, France, and Archangel, time business round about 20s. should be secured. In this connection, it is to be noted that foreign owners in fixing their boats on time exhibit anxiety to exclude the North Sea, whilst charterers are especially anxious to include the White Sea; as a rule, owners offer no objection to this. In the Eastern market steadiness prevails, and the anticipation is that an improvement will shortly come along. With a lack of actual business, there is no alteration in quotable rates. Bombay is worth 52s. 6d. one, and 53s. 9d. to 55s. two ports United Kingdom, on deadweight. From Java, sugar business can be had at 70s. to French ports. In the Gulf section, there is not much interest in

coasting, but it is reported that there are one or two phosphate orders at 30s. Lagos, 40s. Valencia, and 35s. Lisbon. Nitrate charterers have secured the steamer *Coal Hoop*, 5,000 tons, for Huelva, August loading, at 77s. 6d. Outward business from the Tyne has witnessed very little change. Freights are, as compared with last week, slightly lower, Genoa being worth about 25s. to 26s., and Naples has been done at 25s. A shade more easiness also prevails in regard to Bay ports: St. Nazaire stands at 18s. 6d., and Rochefort at 19s. The Cardiff outward market is quiet, shipowners evincing an inclination to hold their boats for an improvement in rates. Representative figures from South Wales ports are:—Cardiff to River Plate, 27s. 9d.; Naples, 24s. 3d.; and Palmas-Madeira, 18s.; Newport to Granville, 11s. 7½d.; and Rouen, 13s. 6d. Hull reports a fairly good inquiry for the coasting branch, with rates based on 16s. for Rouen, from Hull, whilst the level of business for North French ports is 13s. to 13s. 6d., according to size. A 1,200 ton steamer has 19s. 6d. from Hull to Gefle. The steamer *Zayani* has been fixed at 35s. on deadweight from Glasgow and Liverpool to Bombay, with general cargo.

Glasgow.

There have been comparatively few fixtures reported on the Glasgow market during the past week. An upward tendency has been manifested in homeward rates from the River Plate, which advanced from 45s. to 61s. 3d. for up-river loading, the demand being mostly for steamers of a handy size. Bahia Blanca, oats, to London, was reported fixed at 60s. In the East the rate from Karachi to Bristol Channel ports was 45s.; and in the Far East a steamer was fixed for delivery Haiphong, for nine months' time charter, at 12s. 6d. on deadweight for general trading with re-delivery the United Kingdom. American markets were quiet with 7s. 9d. done to Rotterdam for the Relief Commission, and coal rates were easy at 35s. to Italy. In the outward trade from Scottish ports there were very few inquiries for tonnage. One fairly large steamer was booked to load at Glasgow and Liverpool at 36s. 3d. for general cargo. The coal trade was also quiet at about the level of recent quotations. Glasgow to Genoa, Savona or Leghorn, 3,000 tons, about 22s.

Newcastle-on-Tyne.

There has been a much improved degree of activity on the local freight market during the past week, and the volume of chartering done has been more satisfactory than for several recent weeks. Coal shipments have been very heavy, particularly to North France and coasting ports and, generally, there has been a good, steady demand for tonnage. The granting of a number of licences to ship coal cargoes to Sweden also caused an increase in the request for steamers. Simultaneous with the better demand for cargo-space, however, there has been a glut in tonnage, and rates are, therefore, lower. Coasting is little worse on the week, with 7s. 6d. (7s. for a C.T.) still a representative figure for London. North France is decidedly weaker, with Havre 6d. to 1s. decreased and Rouen fully 6d. down, in spite of the fact that there is still great detention to tonnage at the latter port. It is reported that over 60 vessels are at present awaiting discharge at Rouen. The Bay is unaltered, St. Nazaire being worth 19s. and Bordeaux 20s. The Mediterranean has slumped considerably since last report but, at the time of writing, is showing more strength. Genoa is 1s. 6d. to 3s. 6d. lower, Leghorn 6d., Marseilles 3s. 6d., Naples 3s. 6d., and Savona 1s. 6d., whilst Port Said is easier. The Cape Verds are based on 23s. 6d. to St. Vincent. Fixtures arranged since last report include the following:—Bagnoli, 7,000, 26s.; Barcelona, 1,700, 25s.; Bordeaux, 3,300, 20s.; 4,400, 20s.; 1,600, 20s.; Cape Verds, 3,000, 23s. 6d.; Chantenay, 1,700, 19s. 3d.; Caen, 1,200, 14s. 6d.; 650, 14s. 6d.; Fecamp, 650, 15s.; 1,300, 15s.; Genoa, 4,600, 26s.; 3,400, 26s. 6d.; Havre, 2,600, 14s.; 1,500, 14s. 3d.; 1,200, 14s. 6d.; 1,700, 14s.; London, 1,400, 7s. 6d.; 2,400, 7s., C.T.; Leghorn, 2,400, 27s. 6d.; Lisbon, 5,000; 19s.; Marseilles, 4,500, 24s. 6d.; Nantes, 1,700, 19s. 3d.; Naples, 1,800, 26s. 6d.; Oporto, 1,600, 21s. 6d.; Porto Ferrajo, 5,500, 28s. 6d.; 7,000, 26s.; Port Said, 6,800, 28s., reported; 5,000, 26s. 6d.; Rouen, 1,600, 16s.; 1,650, 16s., from Dunston; 1,400, 15s. 6d.; St. Malo, 900, 14s. 6d.; St. Nazaire, 1,900, 19s.; Savona, 4,600, 26s.

Liverpool.

Outward freights on this market are steadying, owing, to some extent, to the better demand for tonnage at the coal ports. But the position is still unstable, and only a sustained demand for boats will maintain rates or carry them to a higher level. This can hardly be looked for while the slack season is on, but looking ahead there is no cause for gloom. The demand is sure to come on again, and when it does there may be experienced a greater scarcity of boats than ever before. With better Plate homeward prospects, boats are being fixed outwards to South America at 27s. 6d. A noteworthy feature is the number of boats fixed to load ore, Huelva to North America, at rates varying from 12s. 3d. to 13s. Manchester has fixed the *Minorca* to Lisbon at 15s. Time chartering is quiet for the liner class of vessel, but steady for the general trades. A White Sea round trip has been done at 16s., and this can be repeated. What is of particular note in the homeward trades is the activity and strength of the River Plate market. Rates have risen within a week by 17s. 6d. to 62s. 6d., and are still tending upwards. North Pacific has also a firmer tendency. Eastern markets are quietly steady, at 75s. Kohsichang to London, and 90s. Vladivostock to United Kingdom, while Saigon quotes 65s. to Liverpool for meal. Indies quiet around 45s. from Karachi to United Kingdom, and 55s. for ore, Bombay to the States. Mediterranean has little movement homewards, but rates are steady. Bona to Dublin made 15s., and a like figure is indicated Sfax to United Kingdom. North America has gone quiet for grain, but the market is not devoid of inquiries. Heavy grain is quoted August-September loading at 10s., from Gulf to French Atlantic, and 10s. 6d. to West Italy. More coal tonnage has been taken up from Virginia, a shipment to the Argentine making 36s. 6d., and to Spain 35s. Sail tonnage is in poor demand outwards, but homewards North Pacific has fixed a boat at 80s., January, and nitrate ports two ships to United Kingdom at 66s., season.

Cardiff and Swansea.

In the past month vessels of a carrying capacity of 610,330 tons were fixed to load at Cardiff or Newport against 1,108,640 tons and 1,649,378 tons in June of 1914 and 1913 respectively. Chartering during the past week was brisker and rates generally were very steady in tone, and if anything inclined to improve. Inquiries were moderate for the Mediterranean, and with tonnage about equal to the demand rates fluctuated very little, being on the basis of Alexandria 25s. (twice); Barcelona, 20s.; Genoa, with options, 22s. 6d. (twice), 21s. 6d. and 23s.; Huelva, 16s.; Gibraltar, 16s. (three times); Lisbon, 15s. (twice); Marseilles, 25 fr. (four); Naples, 21s. 3d. and 21s. 6d.; Oporto, 16s. 6d. and 16s. 3d.; Port Said, 24s.; Sicily, 24s. (twice); and Seville, 17s. Altogether tonnage aggregating 169,580 tons was fixed to load at Cardiff or Newport last week, or 17,350 tons more than in the previous week. Bay and Coasting business was fairly active, the inquiry being urgent, and with tonnage well held rates were easily upheld at Bordeaux, 18 fr. (twice) and 18¼ fr.; Caen, 12s.; Cherbourg, 12s. and 12s. 6d.; Calais, 12s. 9d. and 13s. 6d.; Chantenay, 15½ fr.; Granville, 11s. 7½d.; Havre, 11s.; Nantes, 15 and 15½ fr.; Rouen, 13s. 3d., 13s. 6d. and 13s.; Sables d'Olonne, 16 fr.; and St. Nazaire, 15 fr. (twice) and 15½ fr. South American and Brazilian business was moderate, with rates steady at Buenos Ayres, 27s. 6d.; River Plate, 27s. 6d. (twice), 27s. 9d. and 29s.; Monte Video, 27s. 6d.; Rio de Janeiro, 25s. 6d.; and Bahia Blanca, 28s.; while Canary Islands chartering was represented by Las Palmas or Madeira, 18s.; Cape de Verdes, 20s.; and St. Michaels, 18s. Tonnage of a carrying capacity of 212,910 tons was fixed to load at Swansea or Port Talbot last month, compared with 202,340 and 188,760 tons in June, 1914 and 1913, respectively. In the past week vessels to carry 46,600 tons were fixed, or 7,600 tons less than in the previous. Rates ruled steady for all directions, on the basis of Dieppe, 11s. 9d. (twice) and 12s. 3d.; Rouen, 13s. 6d. (ten), 13s. 3d., 13s. 9d., 14s. and 13s. 7½d. (three); Genoa, with options, 23s. 3d.; and Taranto, 26s. 6d.

Hull.

The market for the Mediterranean direction shows a better tone this week, and rates are based on 26s. to 27s. for Genoa from Hull and 24s. for Alexandria from Hull. In the coasting branch rates are based on 16s. for Rouen from Hull, to which destination a heavy business has been done at 13s. to 13s. 6d. for Treport, Fecamp, Havre, Dieppe and Honfleur from Hull. A vessel has been chartered to Gefle at 19s. 6d. for Hull loading. In the short trades 7s. 6d. quotes for London from Hull. The fact that some licences for Scandinavia have been granted has stimulated that section of the market.

ORDERS PLACED.

The Collingwood Shipbuilding Company, Ltd., of Collingwood, Ont., Canada, has received a contract to construct a steel tank steamer for the Imperial Oil Company, Ltd., of Sarnia and Toronto. The steamer is to be 258 ft. long, with 43 ft. beam, a depth of 18 ft., and is to be ready for delivery next spring.

THE COAL TRADE.

The week opened with the satisfactory news that most of the South Wales collieries which had been idle had resumed work. As might be expected the attitude of the affected miners has had a direct influence on the Cardiff coal market, which can best be described as being in a disorganised condition up to last Saturday. Probably South Wales operators will, by the time these lines appear in print, be in a much better position to gauge the probable trend of events, and this should be followed by more activity in business.

In this market there has been marked irregularity in prices, according to the condition of colliery stems. The feeling prevailed that the stoppages, and the consequent restriction in production, would have but little influence on the general state of the market, having regard to the fact that the stocks of most classes of coal were fairly heavy. Quotations generally underwent but slight alteration. The prices for Admiralty steams remained nominal, these coals being still taken up in large quantities for use on allied warships. Seconds were about steady at from 25s. to 28s. As to the Monmouthshire collieries, it has to be recorded that there has been a general easiness in prices, Eastern Valleys (best sorts) being procurable at 21s. to 23s., Western Valleys at 23s. to 24s., whilst Black Veins could be obtained at about 26s. to 27s. Pitwood stands at 26s. to 26s. 6d. per ton. Owing to trouble with the miners the position in the South Wales coalfield is, at the time of writing, not without its critical aspect, although the view prevails that a satisfactory settlement of the points in dispute should be arrived at.

North-East Coast.

Difficulty in obtaining licences for the exportation of coal has exercised a retarding influence on Tyne business. It has to be admitted that licences are granted very sparingly, the result being that expected shipments cannot be sent forward. This condition of affairs has placed the market in a rather unusual position. The general inquiry for the various grades has not been at all bad, and the collieries are well sold—indeed, over sold. But the difficulties placed in the way of shippers by the withholding of licences has practically put the brake on production. At the close of last week one colliery found it necessary to intimate that if the licences asked for did not come along without delay, the pits would have to be laid idle over the week-end.

Prices, on the whole, have maintained a steady level with D.C.B. steams, quoted at 21s. to 21s. 6d. Tyne primes stood at about 19s., but a weaker tendency prevailed in smalls, which could be procured at 13s. 9d. for Blyth and 15s. for Tyne primes. For delivery before the close of the year 13s. a ton f.o.b. has been paid for a quantity of D.C.B. smalls. There has been practically no alteration in Durham prices. Gas qualities have remained steady. Tyne bunkers, for prompt delivery, have been sold at 16s. to 16s. 6d. Wear special gas coal is quoted nominally at 23s., with household coal at 20s. to 23s. The market on the whole shows little change.

The Humber.

As at other coal-shipping ports, the licencing question has brought its own difficulties into the Hull coal market. At 18s. f.o.b. best Association hards are slightly firmer. For selected grades 20s.—in some cases even more—is asked. There is but small demand for West Yorkshire Hartleys, which are quoted at 17s. 6d. to 18s. 6d. Washed smalls f.o.b. stand at 13s. to 14s. 6d.

London.

Quietness has prevailed in the London market, although marked firmness has characterised the railborne household section. At the close of June best West Yorkshire coal was quoted at 18s. 6d. per ton, although sellers were refusing to book further orders. Steams were, comparatively speaking, in fair demand and firm in price. For smalls there has been an active inquiry, but the supply has been somewhat limited.

The July price list issued by coal owners in the Midlands gives notice of marked advances in the figures for domestic fuel. There is also an advance in all kinds of manufacturing fuels. Consumers of household coal are faced with an increase of 2s. to 3s. per ton.

From Genoa it is reported that although business is very far from normal, the coal market there has lately been a little brighter. One by one consumers, as their stocks become depleted, are coming into the market for supplies. Prices, however, are being kept down, partly as a result of the continued arrival of American coal.

A difficulty which is now to be anticipated in this market is the shortage of coal wagons. With the harvest season near at hand and the requisitioning of rolling-stock for military purposes, it is to be assumed that the wagon difficulty will be more pronounced this year than ever. It is bad enough in ordinary harvest seasons; what it will be like this year time alone can show.

COMPANY MEETINGS.

Ellerman Lines, Ltd.—Presiding at the annual meeting, held on June 30, Sir John Ellerman, Bart., said that the company by its constitution did not and never had given any profit and loss account. The shares in the hands of the public had a limited dividend and limited rights, and it was enough for him to say that the results showed that all its dividends in the aggregate were more than five times covered by the earnings of the company. Their fleet now aggregated 633,000 tons gross with a carrying capacity of nearly 1,000,000, and they had placed at the disposal of the Government nearly 175,000 tons. Some of this had been returned, and they had, roughly, 80,000 tons employed now by the Government. Of the ships that had been returned, this had been done practically at a moment's notice, and there was no possibility of making other provision for their employment. Since the beginning of this year freights had advanced materially, and there was reason to believe the results for the ensuing year would be of a favourable character. Unfortunately there were also increased working expenses and congestion at every port. The Government requisitioning of steamers and the delays were two of the main factors which had shortened the supply of available tonnage, and therefore increased the rates which merchants were prepared to pay to get their cargo removed. The rates were very sensitive, and fluctuated almost from day to day. The tendency, owing to the further delays which were taking place and the smaller number of men available for loading and discharging, was in the immediate future to cause these rates still further to increase beyond the level at which they stood at the present time. The value of the fleet was, roughly, £10,000,000, as against the £3,500,000 at which it stood in the company's books.

COMPANY REPORTS.

Court Line, Ltd.—Interim dividend at the rate of 12 per cent. per annum for the first six months of the year 1915.

Indemnity Mutual Marine Assurance Company, Ltd.—Interim dividend of 7s. per share, less income-tax, compared with 6s. per share free of tax last year.

Tatem Steam Navigation Company, Ltd. (Cardiff).—The report for the year ended June 30 shows that the profits, including £23,818 brought forward from last account, amount to £130,523, out of which has been paid in dividends £52,500 (15 per cent.); reserve for income-tax, £30,000; reserve for war risk calls, £10,000; total, £92,500; leaving a balance of £38,023 5s. 5d. to carry forward to next account. Profits and dividends in the previous three years were :—

Period.	Profit.	Dividend.
15 months ended June 30, 1912	£251,072	15 per cent.
12 ,, ,, 1913	£352,347	,, ,,
12 ,, ,, ,, 1914	£93,557	,, ,,

Great City Steamship Company, Ltd.—Messrs. W. R. Smith & Sons, Cardiff (managers), in the balance sheet to May 20, state that the steamer *Great City* was delivered to the company on April 3, 1914, the steamer *Homer City* on January 21, 1915, and the steamer *Jersey City* on January 30, 1915. The total profits dealt with in the accounts are £50,357. All the preliminary expenses have been wiped off; these expenses cover the three issues of capital, all of which were over-subscribed. £15,000 has been placed to reserve for depreciation, and after providing for builders' interests, &c., the balance of profit carried forward amounts to £17,662.

St. Just Steamship Company, Ltd.—Messrs. W. R. Smith & Sons, Cardiff (managers), in the balance sheet to May 20, state that the total voyage profits amount to £29,696, which, added to the balance brought forward, viz., £1,721, make a total of £31,417. The interim dividends paid during the year, namely 11 per cent. free of income-tax, absorb £9,900. It has been thought advisable to wipe off the balance of preliminary expenses, namely, £1,319, and to strengthen the reserves account for depreciation by a further £10,000. The reserve account now totals £15,928, thus reducing the first cost to

£10,000. After making allowances for builders' interest, income tax, interest on loans and repairs, there is a balance of £7,705 carried forward to next account.

Watson Steamship Company, Ltd.—Although the accounts for the year ended June 30 cannot be completed for some time, the directors have decided that in view of the financial demands of the country, the convenience of the shareholders will be served by paying the dividend forthwith. The directors have therefore decided to pay 15 per cent., free of income-tax, which they know to be justified by the accounts.

Bradford Steamship Company, Ltd.—Messrs. W. R. Smith & Sons, Cardiff (managers), in their balance sheet to May 20, state that the total profits dealt with amount to £41,268, the net voyage profits amounting for £39,792. The ss. *Atlantic City*, with sugar from Peru to Liverpool, chartered last September at a low rate of freight, they say, was detained at Liverpool 62 days, discharging a part cargo only. Interim dividends paid for the year totalling, 11 per cent. free of income-tax, absorb £14,630; income-tax paid amounted to £1,339; and the balance of preliminary expenses, £655, had been written off. £15,000 had been placed to reserve for depreciation, thereby increasing the reserve account to £27,896. The balance carried forward was £9,876.

Britain Steamship Company, Ltd.—The accounts for 1914 show a net profit of £45,692. Interim dividends of 2 per cent. were paid on September 23 and December 22 last, absorbing £18,558, leaving a balance of £31,498 available for distribution. The directors recommend payment of a further dividend to December 31 last of 6 per cent., making 10 per cent. for the year, absorbing £27,837, carrying forward £3,661. It is stated that no depreciation has been written off, as the value of the steamers owned by the company has appreciated. The ss. *Dulwich*, while on passage from Hull to Rouen, was torpedoed by a German submarine off the French coast and sunk on February 15. The crew, with the exception of two men, were saved. The ss. *Aldershot* has recently been disposed of on favourable terms, and will be delivered to the buyers very shortly.

Empire Transport Company, Ltd.—The report ended June 30 states that the trading results, including the credit on sale of ss. *Argentine Transport* and the carry forward of £1,480, show a total of £187,434. After deducting debenture interest, general management and interest charges, maintenance, repairs and renewals, trustees', directors' and auditors' fees, there remains a balance of £126,600, of which £35,000 has been allocated to depreciation, raising that fund to £135,000, £58,000 has been written off debenture issue account, entirely deleting this item, £5,000 has been transferred to the insurance fund, increasing this to £10,000, £10,000 has been transferred to survey repair reserve account. The preference dividend paid on July 1 absorbed £6,000, and the directors recommend a dividend of 10 per cent. on the ordinary shares for the year, absorbing £12,500, leaving £100 to be carried forward. £35,000 first mortgage debentures have been redeemed, in accordance with the provisions of the debenture trust deed.

Instow Steamship Company, Ltd.—Messrs. W. R. Smith & Sons, Cardiff (managers), in their balance sheet to May 20, state that the company has had a very unfortunate experience during the war. On September 21, 1914, the *Cornish City* was sunk by the *Karlsruhe*. In October last they purchased the *Indian City*, then building, at a very reasonable price, namely, £51,903, and the steamer, which was delivered to them on January 13, 1915, was sunk by the German submarine *U* 29, off the Scilly Islands, on March 12, 1915. No other shipping company, the report states, has had such a disastrous experience. The balance from last account was £1,183, net voyage profits were £24,649, bank interest &c., £639, a total profit of £26,471. Interim dividends paid 15 per cent., absorbed £8,250, and after allowing for interest, income-tax and repairs, the balance of the profit carried forward amounts to £15,908. The only steamer now belonging to the company stands in the books at £17,408, every provision having been made for depreciation. The deposit account with the bank covers proceeds from the *Indian City*.

Nippon Yusen Kaisha.—The report for the half-year ended March 31 last states that the gross profits of the company for the past half-year amount to 5,229,280 yen, out of which there has been deducted—depreciation of the company's fleet and property, 1,308,565 yen; insurance fund, 732,245 yen; ships' structural repair fund, 800,197 yen, leaving a balance of 3,212,869 yen, including 824,597 yen brought forward from last account. The directors now propose that this surplus be appropriated as follows:— Reserve fund, 119,413 yen; fund for the extension of services and improvement of the fleet, 200,000 yen; reserve for construction and repairs of buildings, 500,000 yen; special reserve, 300,000 yen. From the remaining balance, 2,093,455 yen, the directors further propose that 110,000 yen be allowed as the directors' and auditors' fees, and recommend a dividend at the rate of 10 per cent. per annum, which will absorb 1,100,000 yen, leaving a balance of 883,455 yen to be carried forward to next account. There are 12 steamers building of a total of 76,200 tons gross. Nine of these are 7,300 tons each.

Pacific Mail Steamship Company.—The report for the year ended April 30, 1915, shows that the revenues from water line operations were $5,737,662, as compared with $5,560,239 the previous year, with a net operating revenue from water line operations of $4,731,392, against $4,743,727. The gross income of the company from all sources for the year was $1,046,891, as compared with $849,669 in 1914, with a net income of $888,481, against $710,840. The fleet of the Pacific Mail Steamship Company has a book valuation of $11,298,291.

NEWS PARAGRAPHS.

The Torpedoing of the "Armenian."—The Leyland liner *Armenian* was torpedoed and sunk on June 28 by a German submarine. The vessel was carrying 1,414 mules, which were consigned for the port of Avonmouth. A large number of the missing are American citizens.

Suez Canal Traffic.—The Suez Canal Company has issued a denial to the report emanating from an Italian source that navigation through the Canal has been re-opened after a momentary interruption due to the sinking of a ship which necessitated considerable work. The company declares that navigation through the Canal has never been interrupted, as is shown by the publication of the daily receipts.

United States Mercantile Marine.—A Reuter message from Washington, dated June 23, states that a referendum conducted by the Chambers of Commerce of the United States as to the various means of developing the American merchant marine showed that there was overwhelming opposition to the Government purchase, charter, or operation of ships, and an almost unanimous sentiment in favour of a subsidy to set-off the difference in the working expenses of American and foreign craft.

A "U" Boat's Disguise.—The captain of the schooner *L. C. Tower*, of Parraboro, N.S., which was sunk on Thursday last week, states that the submarine afterwards rigged itself up with two canvas funnels and two masts, resembling a heavily-ladened steamer with smoke issuing from two dummy funnels. The schooner was torpedoed 25 miles S.S.W. of the Fastnet. Three other vessels were sunk on the same day. The largest of these was the steamer *Caucasian*, 4,656 tons, of London, which was torpedoed off the Scilly Isles. The submarine afterwards sank the *Inglemoor*, 4,331 tons, in the same neighbourhood. The third vessel was the *Welbury*, a steamer of 3,591 tons belonging to West Hartlepool.

New Havre-Swansea-Bristol Service.—A new and regular service between Havre, Swansea and Bristol, and *vice versa*, will commence shortly by the Anglo-French Transit Company (Worms & Co., proprietors), who have also services Havre and Rouen to Bordeaux, Brest, Nantes, Lorient, La Rochelle, Pallice, Bayonne, Pasajes. It is intended to load the first steamer at Havre about July 23, and she would be ready to receive cargo in Bristol on July 26. It is intended to have fortnightly sailings from Havre every alternate Friday night, Bristol every alternate Wednesday night, and Swansea every alternate Saturday night. The first sailing is to be taken by the ss. *Hypolite Worms*.

H.A.L. Leases One of Its Piers.—On account of the increased amount of cargo handled to New York from the Isthmus by the Panama Railroad Steamship Line, following the discontinuance of the services between New York and the Isthmus of the Royal Mail Steam Packet Company and the Hamburg-Amerika Line, the Panama Railroad Steamship Line has been using in addition to its regular terminals in New York, Pier 65, North River, leased from the Hamburg-Amerika Line for £300 per month, subject to cancellation on 15 days' notice from either party to the contract. The pier is used only for the handling of cargo, and departures of passenger-carrying vessels of the line are all made from Pier 67, North River, as heretofore.

OFFICIAL NOTICES AND SHIPS FOR SALE.

FOR SALE.

Folio 9098. Built 1906. Surveyed 1915. About 6,650 tons d.w. on about 23 ft. 9 in. draught. Single Deck. Triple Engines. Two Single-ended Boilers. Speed about 9¼ knots on about 26 tons. Prompt Delivery.

Folio 8918. Built 1906. About 6,400 tons d.w. on about 21 ft. 5 in. draught. Single Deck. Triple Engines. Two Single-ended Boilers. Speed about 8½ 9 knots on about 24 tons. Early Delivery.

Folio 7751.—Built 1898. Surveyed 1914. About 5,550 tons d.w. on about 22 ft. 9 in. draught. One Deck and Spar Deck. Triple Engines. Two Single-ended Boilers. Speed about 9-9¼ knots on about 20 tons. Early Delivery.

Folio 9009.—Built 1894. Surveyed 1915. About 4,750 tons d.w. on about 22 ft. 4 in. draught. Two Decks. Triple Engines. Two Single-ended Boilers. Speed about 9½ knots on about 15 tons Welsh. Prompt Delivery.

Folio 7029.—Built 1891. About 3,000 tons d.w. on about 20 ft. 7 in. draught. Part Awning Deck. Triple Engines. Two Single-ended Boilers. Speed about 8½ knots on about 16 tons. Prompt delivery.

For further particulars, plans, prices, &c., apply to:—

THOS. PINKNEY & SONS,
Sunderland.

Telegraphic Address —"Spardeck."

FOR SALE.

Folio 4150.—Steel single-deck steamer, long bridge. Built 1903. About 5,450 tons d.w. on 22¼ ft. draught. Triple Engines. Two single-ended boilers. Speed 8½–9 knots on about 17 tons. Delivery U.K. in August.

Further particulars, plan, price, &c., on application.

EDWARD HALL,
112, Bute Street,
Cardiff.

Broker for the Sale, Purchase and Construction of Shipping Property; Marine Surveyor.

Telegraphic Address:—
"Salvage."

FOR SALE.—Complete set "Institute Naval Architects Proceedings" from Vol. 1 to date. £15 15s. 0d. Apply—J. Smith & Son (Glasgow) Ltd., 195, George Street, Glasgow.

THE Proprietors of the Patent No. 17930 of 1912 for "Improvements in or relating to Mechanism for Controlling the Valves of Submerged Torpedo Tubes," are desirous of entering into arrangements by way of license and otherwise, on reasonable terms, for the purpose of exploiting the same and ensuring its full development and practical working in this country.—All communications should be addressed in the first instance to HASELTINE, LAKE & CO., Chartered Patent Agents, 28, Southampton Buildings, Chancery Lane, London, W.C.

OFFICIAL NOTICES AND SHIPS FOR SALE.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Wednesday.

All advertisements should be addressed to:—

Shipbuilding and Shipping Record,
Queen Anne's Chambers,
Westminster,
London, S.W.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year.	Machinery and builders.	Remarks.
Agenoria, ss. (single dk.)	2,977 gr. 1,931 net.	330½′ × 46′ × 22½′	Rickinson, Sons & Co., W. Hartlepool, to British buyers	R. Craggs & Sons, Middlesbrough (1902)	24, 38, 64 × 42 (Richardsons, Westgarth & Co., Middlesbrough)	Price about £41,000.
Argo, ss. ...	3,071 gr. 1,970 net.	325′ × 47′ × 22½′	Rickinson, Sons & Co., W. Hartlepool, to W. H. Vernall, London	W. Gray & Co., W. Hartlepool (1895)	24, 38, 64 × 42 (Cen. Mar. Eng. Works, W. Hartlepool)	Price about £28,000.
Benedick, ss. ('tween dk.)	2,711 gr. 1,758 net. 4,250 d.w.	320′ × 40′ × 24½′	Franco-British SS. Co. (Olivier & Co.), London, to buyers not stated	C. S. Swan & Hunter, Newcastle (1888)	24, 39, 64 × 42 (T. Richardson & Sons, Hartlepool)	
Camperdown, ss. (single dk.)	3,046 gr. 1,932 net.	331′ × 49′ × 21¼′	Glen & Co., Glasgow, to British buyers	Russell & Co., Port Glasgow (1914)	23, 33, 61 × 42 (Clyde S.B. & Eng. Co., Port Glasgow)	
Citadel, ss. (single dk.) ex *Dunning Gyle*	197 gr. 108 net.	102¼′ × 22½′ × 10′	J. McDonald, Ltd. (McDonald & Morrison), Inverness, to W. J. Garscadden, Glasgow	Built at Venersborg (1871) ...	10½, 25 × 17½ (Kristinehamns Mek. Verks.)	–
Corkerill, ss. (single dk.), renamed **Mabel Baird**	2,393 gr. 1,463 net.	288½′ × 45′ × 25′	Armement Adolf Deppe, Bristol (late of Antwerp), to J. W. Baird & Co., W. Hartlepool	Soc. Anon. J. Cockerill, Hoboken (1901)	22½, 36½, 60 × 41¼ (Richardsons, Westgarth & Co., Middlesbrough)	–
Constantinos Samaras, ss. (part awning dk.), ex *Sotmanton*	2,486 gr. 1,482 net.	294′ × 39½′ × 19½′	Soc. Anon. Vinicole d'Huileries et d'Armement (G. A. Issaias & C. Zahocostas), Piraeus, to British buyers	J. Blumer & Co., Sunderland (1891)	22½, 36½, 60 × 39 (Blair & Co., Stockton)	Price about £20,000.
Elleline, ss. ..	3,875 gr. 2,491 net.	346′ × 49½′ × 26½′	Hutchins Bros., Cardiff, to J. Holman & Sons, London	J. Readhead & Sons, South Shields (1906)	25, 42, 68 × 45 (J. Readhead & Sons)	—
Fingal, barque	2,563 gr. 2,435 net.	308½′ × 42¼′ × 25′	Akt. Fingal (Chr. Hannevig) Horten, to Akt. Transatlantic Motor Ship Co.	Harland & Wolff, Belfast (1883)		-
Georgia ss. (spar dk.) (re-named **Honsatonic**)	3,143 gr. 2,022 net.	329½′ × 40′ × 19½′	Hamburg-Amerika Linie, Hamburg, to Honsatonic SS. Co.	Barclay, Curle & Co., Glasgow (1891)	24, 39, 64 × 42 (Barclay, Curle & Co.)	Price about £17,500.
Hermonthis, ss. (well dk.) (ex *Lucina*)	4,782 gr. 3,096 net.	382′ × 48½′ × 26½′	Deutsche Dampfs. Ges. Kosmos, Hamburg, to Hugo Hedrich, Altona	J. L. Thompson & Sons, Sunderland (1896)	27, 44, 72 × 48 (G. Clark, Sunderland)	—
Lula, (ex *Boma*) (pt. awning dk.)	2,427 gr. 1,567 net.	297′ × 40′ × 18½′	J. Diacakis & Co., Syra, to British buyers	R. Dixon & Co., Middlesbro' (1890)	22, 35, 59 × 39 (T. Richardson & Sons, Hartlepool)	Sold 9 years ago for £12,000. Now sold for about £19,250.
Mills, ss. (single dk.)	3,070 gr. 2,007 net.	293′ × 52⅔′ × 21′	Ogden Mills, New York, to General Petroleum Co.	Maryland Steel Co., Sparrow Point, Maryland (1901)	18, 28, 45 × 30 (Maryland Steel Co.)	Converted into an oil burner to trade between Puget Sound and California.
Nio Maru, ss. (pt. awning dk.), ex *Sopernik*, ex *Norge*	3,184 gr. 1,974 net.	324½′ × 41½′ × 20½′	Tatsuuma Kisen Goshi Kaisha, Kobe, to Chuyetsu Kisen Kabushiki Kaisha, Prov. Yetchu	Ropner & Son, Stockton (1891)	23, 37½, 61½ × 39 (Blair & Co., Stockton)	—
Pentaur, ss. ...	3,061 gr. 1,958 net.	322½′ × 40½′ × 24½′	Durban Whaling Co., Port Natal, to Chr. Salvesen & Co., Leith	Flensburger Schiffs. Ges., Flensburg (1892)	25, 41, 68 × 45 (Flensburger Schiffs. Ges.)	
Shimosa, ss. (spar dk.)	4,221 gr. 2,699 net.	370½′ × 48½′ × 18½′	New York & Oriental SS. Co. (Barber & Co.), Liverpool, to J. Barnett & Co., Liverpool.	Short Bros., Sunderland (1902)	26, 43, 71 × 51 (J. Dickinson & Sons, Sunderland)	—
Sumatra, ss. ...	4,615 gr. 2,958 net. 5,970 d.w.	400′ × 46½′ × 27½′ (20′)	Arab Steamers, Bombay, to buyers not stated	A. Stephen & Sons, Linthouse (1895)	28, 46, 77 × 54 (A. Stephen & Sons)	
Torvig, ss. (part awning dk.) (ex *Castlepold*)	2,190 gr. 1,397 net.	277′ × 37½′ × 18½′	H. Persson & Co., Landskrona, to M. Clausen, Haugesund	Richardson, Duck & Co., Stockton (1890)	21, 35, 57 × 39 (Blair & Co., Stockton)	Price about £20,000. Changed hands last year for about £9,500.

SHIPPING SHARE MARKET.

[illegible] and shipbuilding companies were not behind other industrial undertakings in the strong support they have given to the Loan. In the only report, [illegible] is stated that an investment of £20,000 has been made in the War Loan. The accounts of the company disclose excellent trading results. After deducting debenture interest, fees, &c., there is a balance of £126,600. This compares with £64,[illegible] for the year to June 30, 1914, and is a magnificent testimony of the organisation of the company's business by Humbler Brothers and bears out the optimistic prediction of the late Sir Stephen Furness a year ago. The market has also been commenting admiringly upon the celerity of the accountancy department of the company. The accounts are made up to Wednesday, June 30, the end of the financial year, and were audited, approved by the Directors, printed, and posted on Saturday, July 3. This appears to beat all previous records of the department. There does not appear to be any undue anxiety with regard to the threatened taxation of "war profits," as it is anticipated that, apart from the details which have already been made known, a higher rate of income-tax will be imposed upon dividends declared over a certain average of the past few years.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING AND DOCKS.

Name	Share and [illegible]	Extreme quotations, 1913.	Last ann. div. or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
African S.S.	20	21½ - 19	7	7[illegible]	18 - 20	—
[illegible]	100	95 - 89	4	4[illegible]	93½ - 95½	—
[illegible] Cum. pref.	10	10[illegible] - 10	5½	[illegible]	10 - 10½	10½
[illegible] Deb.	Stk.	98½ - 98	4	4[illegible]	104 - 106	104
Argentine Nav. ... Cum. pref.	1	29/6 - [illegible]	5	2[illegible]	[illegible]	—
[illegible] Deb.	Bds.	104½ - 100	6	6[illegible]	98 - 100	99
Australasian Un. S. Nav. Deb.	Stk.	84½ - 81½	4	4[illegible]	80 - 83	—
Belfast Steam ... "A"	10 (5pd.)	5⅞ - 4½	5	[illegible]	4½ - 5½	—
British & African Nav. Deb.	Stk.	102—101	4½	4[illegible]	96½ - 98½	103
British India Nav. ... Deb.	Stk.	104—98⅝	4½	4[illegible]	99½—100	99½
Bucknall SS. ... Cum. pref.	1	2⅛ - 1⅛	5½	—	—	—
[illegible] ... Deb.	Bds.	102—99	5	5[illegible]	91—93	—
[illegible] ... Ord.	10	14⅜ - 8	15	1[illegible]	10½—11	13[illegible]
Court Line ... Ord.	£1		10	9	—	1[illegible]
Cunard SS. ... Ord.	1	35/8 - 28	20	9	1⅞ - 1½	2
Do. ... Cum. pref.	Stk.	103—97½	5	5[illegible]	99—101	99
Do. ... Deb.	Stk.	102⅜ - 99	4½	4[illegible]	101—103	99½
Elder Line ... Deb.	Stk.	103—100	4½	4½	98—102	100
Elder Dempster ... Cum. pref.	1	1½ - 1⅛	5½	5[illegible]	1⅛ - 1[illegible]	1
Do. ... ... Deb.	Stk.	105 - 99½	5	5	102—104	98
Ellerman Lines ... Pref. Ord.	10	10⅜ - 10⅛	6½	6	10 - 10⅜	9[illegible]
Do. ... Cum. pref.	10	10⅜ - 10⅛	4½	4[illegible]	10 - 10⅜	9[illegible]
Fraser Fenwick ... Cum. pref.	5	97/6 - 92/6	5½	6[illegible]	4⅜ - 5	4[illegible]
Furness, Withy ... Ord.	1	34/3 - 25/6	10	6[illegible]	1⅜ - 1⅝	1
Do. ... Cum. pref.	10	9¾ - 9⅛	5	5	9⅜ - 10	9[illegible]
General Steam Nav. Ord.	7½	6⅛ - 5⅜	8	8	5⅜ - 5¾	5[illegible]
Do. ... ... Pref.	8	7¼ - 7⅛	6	7½	7⅜ - 7¾	6[illegible]
Houlder Line ... Cum. pref.	5	85/—60/-	Nil.	Nil.	2⅜ - 2¾	4[illegible]
Do. ... ... Deb.	Stk.	84⅛ - 80	4⅜	5[illegible]	81—86	83
Houlder Bros. ... Cum. pref.	5	4⅜ - 3	5⅜	5[illegible]	4⅜ - 4⅝	4[illegible]
Do. ... ... Deb.	Stk.	85—78	4½	5	81—86	90[illegible]
India Gen. Nav. & Rly. ... Ord.	10	9¾ - 7⅛	8	10	9—10	8
Indo-China N. ... Pref. Ord.	5	5[illegible] - 87/6	6	6[illegible]	3¼ - 4⅜	4¼
Irrawaddy Flotilla	40	125—114	15	12[illegible]	126[illegible] - 128½	—
King Line ... Ord.	10	9⅛ - 8	8	7[illegible]	8⅛ - 9⅜	10[illegible]
La Guaira Harbour ... Deb.	Stk.	87—79	5	—	78—80	73
Lamport & Holt ... Cum. pref.	£1	1⅛ - [illegible]	6	6	1[illegible] - 1[illegible]	1
Leyland (F.) ... Cum. pref.	10	11—9⅜	10	10[illegible]	7[illegible] - 8[illegible]	9[illegible]
Do. ... ... Deb.	100	99⅜—95⅜	4	4	99—101	—
Mercantile SS. ... ... Ord.	5	8[illegible] - 6[illegible]	17½	16[illegible]	6—6⅜	8[illegible]
Do. ... ... Pref.	1	18/—16/3	5	5[illegible]	¾—1	1[illegible]
Moor Line ... ... Ord.	10	14—11[illegible]	15	—	—	—
Nelson Steam Nav. ... Deb.	100	103⅜—99	5	4[illegible]	99½—101⅜	100½
New Zealand ... ... Ord.	8	20[illegible]—10[illegible]	8	5	14[illegible] - 15[illegible]	20[illegible]
Do. ... ... Deb.	Stk.	95—92½	4	4[illegible]	92—94	90[illegible]
Nitrate Producers SS. ... Ord.	5	8[illegible]—8	12½	7[illegible]	8—8⅜	12[illegible]
Do. ... Cum. pref.	5	5—97/6	5	—	4⅜—5	—
Oceanic Steam. Nav. ... Deb.	100	100—96⅜	4½	—	97—99	96½
Orient.Stm.Nav.Co. Cum. pref.	10	10⅜—9[illegible]	5	5[illegible]	9⅜—10	9[illegible]
Do. ... ... Deb.	100	99—94½	4½	4[illegible]	98—100	97[illegible]
P. & O. S. N. ... Cum pref.	100	125⅜—107	5	5[illegible]	109—112	92[illegible]
Do. ... ... Def.	100	350—270	15	6	270—290	252
Do. ... ... Deb.	Stk.	91—83	3½	4[illegible]	84—86	80[illegible]
Prince Line	1	25/3—20/-	5	3[illegible]	1 - 1⅛	1[illegible]
R.M.S.P. ... ... Ord.	100	143—100½	Nil.	Nil.	82—87	85[illegible]
Do. ... ... Pref.	Stk.	100⅛—96	5	5[illegible]	98—101	92[illegible]
Do. ... ... Deb.	Stk.	104¼—100⅜	4½	4[illegible]	101—103	99
Shaw, Savill & Alb. Cum. pref.	5	5⅜—96/3	5	—	4⅜—5	—
Shell Transport ... Ord.	1	5[illegible]—96/10½	30	5[illegible]	4 - 4⅛	4[illegible]
Do. ... Cum pref.	10	11[illegible]—10	5	4[illegible]	10[illegible]—10[illegible]	10[illegible]
Sutherland SS. Co.	£1	1[illegible] - 1	20	13[illegible]	1—1⅛	1[illegible]
Union-Castle SS. Cum. pref.	10	10—9⅜	4⅜	5	8½ - 9¼	8[illegible]
Do. ... ... Deb.	Stk.	95[illegible] - 92	4	4[illegible]	93 - 95	91½
Union SS. of N. Z. ... Deb.	Stk.	95—91	—	—	—	—
West Hartlepool ... ... Pref.	10	4[illegible]—3[illegible]	Nil.	Nil.	2⅜ - 3½	7[illegible]

INSURANCE.

Alliance	20 (2½ pd.)	12[illegible] - 11[illegible]	12/-	5[illegible]	11[illegible] - 12[illegible]	10[illegible]
Do. new shares ...	1	14[illegible] - 12[illegible]	12/-	5[illegible]	13[illegible] - 14[illegible]	11[illegible]
Indemn. Mutual Marine ...	15 (3 pd.)	10[illegible] - 8[illegible]	11[illegible]	5	10—11	1
London Assurance	25 (12½ pd.)	54—49	20	4[illegible]	54—56	50[illegible]
Marine Insurance	25 (15 pd.)	38[illegible] - 36[illegible]	45/-	6[illegible]	38[illegible] - 39[illegible]	40[illegible]
Maritime Insurance ...	10 (2 pd.)	5[illegible] - 4[illegible]	12½	—	8[illegible] - 9[illegible]	—
Merchants' Marine Insurance ...	10 (2½ pd.)	66 3—61/3	7½	11[illegible]	4—4½	4[illegible]
N. British & Mercantile Ord.	25 (6½ pd.)	4[illegible] - 38[illegible]	40/-	5[illegible]	40[illegible] - 41½	39[illegible]
Do. Pref.	Stk.	100[illegible] - 99[illegible]	4	4[illegible]	98 - 100	99[illegible]
Provident Association ...	10 (1 pd.)	7[illegible] - 7	1[illegible]	1[illegible]	7[illegible] - 8	7[illegible]
Reliance Marine ...	10 (2 pd.)	7 - 6[illegible]	17½	14[illegible]	7[illegible] - 7½	7[illegible]
Royal Exchange Assurance	Stk.	210—196½	10	5	213—218	220
Sea Insurance	10 (2 pd.)	20—17½	8	4	20—21	20[illegible]
World Marine Ins. Co.	5 (2 pd.)	2[illegible] - 2[illegible]	5	5[illegible]	1[illegible] - 1[illegible]	1[illegible]

* With arrears. † Includes 2½ bonus.

IRON AND STEEL.

Name	Share and [illegible]	Extreme quotations, 1913.	Last ann. div. or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
Babcock & Wilcox.. ... Ord.	1	69 4[illegible]—56/3	16	5[illegible]	2[illegible] - 2[illegible]	2[illegible]
Baldwins ... Cum. pref.	1	22/6—21/3	5½	5[illegible]	1[illegible] - 1[illegible]	1[illegible]
Do. ... ... Deb.	Stk.	100[illegible]—100[illegible]	4½	4[illegible]	97—99	99
Bayliss, Jones ... Cum. pref.	1	—	5	7[illegible]	[illegible]	[illegible]
Bell Bros. ... ... Cum. pref.	10	12[illegible]—11	6	5[illegible]	11[illegible]—12[illegible]	10[illegible]
Do. ... ... Deb.	Stk.	98—96[illegible]	4	4[illegible]	96—98	96—98
Bessemer (Henry) ... Ord.	1	1[illegible]—1[illegible]	10	8[illegible]	1[illegible] - 1[illegible]	1[illegible]
Bolckow Vaughan ... Ord.	1	22/6-19/4½	6	6	1[illegible]—1[illegible]	1[illegible]
Do. ... ... Cum. pref.	20	21[illegible] - 20 -	5	4[illegible]	20 - 21	20—21
Cargo Fleet Iron ... Ord.	1	11/10[illegible]—7/6	2½	5	[illegible]	[illegible]
Do. ... ... Deb.	100	91—85[illegible]	4[illegible]	—	89—92	89½
Consett Iron Co. ... ... Ord.	1	88/6—74/6	30	7[illegible]	3[illegible] - 3[illegible]	3[illegible]
Dominion Iron & Steel	Bds.	100[illegible] - 88[illegible]	5	—	83—87	76[illegible]
Dorman, Long ... ... Ord.	1	21/6—16/9	7½	8[illegible]	[illegible] - [illegible]	1[illegible]
Do. ... ... Deb.	Stk.	88[illegible]—85[illegible]	4	4[illegible]	87—90	84[illegible]
Ebbw Vale Steel & Iron Ord.	1	18/—16/-	10	10	[illegible] - [illegible]	1[illegible]
Guest, Keen & Nettlefds Ord.	1	68/9—61/3	15	4[illegible]	3[illegible] - 3[illegible]	3[illegible]
Do. ... ... Cum. pref.	5	5[illegible] - 5[illegible]	5	4[illegible]	5[illegible] - 5[illegible]	5[illegible]
Do. ... ... Deb.	Stk.	100[illegible]—95[illegible]	4	4[illegible]	96—98	94[illegible]
Hadfield's Steel Foundry Ord.	1	63/—58/9	22½	7[illegible]	3 - 3[illegible]	3[illegible]
Hawthorn (R. & W.) Leslie Ord.	10	13—12	10	7[illegible]	13[illegible]—13[illegible]	13[illegible] 14
Ibbotson Bros.	5 (4 pd.)	7—5[illegible]	10	7[illegible]	6—6[illegible]	6—6½
Jessop (W.) & Sons ... Ord.	5 (4 pd.)	6[illegible] - 6[illegible]	15	11[illegible]	6[illegible] - 6[illegible]	6[illegible]
Lanarkshire Steel ... Cum. pref.	10	7[illegible] - 6[illegible]	5	6[illegible]	5[illegible] - 6[illegible]	6
Lysaght (J.) ... Cum. pref.	1	27/6—25/-	8	1[illegible]	1[illegible] -1[illegible]	5
Do. ... ... Deb.	Stk.	108[illegible]—102[illegible]	4½	—	104—106	—
Manganese Bronze ... Ord.	1	[illegible] - [illegible]	6	11	[illegible] - [illegible]	[illegible]
Do. ... ... Cum. pref.	1	1—[illegible]	6	6[illegible]	[illegible] - 1	[illegible]
North-Eastern Steel ... Deb.	Stk.	89—92	4½	—	—	—
Palmers Ship & Iron "A"	1	[illegible] - [illegible]	Nil.	Nil.	[illegible] - [illegible]	—
Scott (Walter) ... ... Ord.	1	16/—14/6	5	[illegible]	[illegible] - [illegible]	[illegible] - [illegible]
Do. ... ... Deb.	Stk.	86—82	4	[illegible]	81—82	89 - 91
Sheffield Forge ... ... Ord.	1	1[illegible]—1[illegible]	12[illegible]	7	1[illegible] - 1[illegible]	1[illegible]
Shelton Iron & Steel ... Deb.	100	99[illegible]—90	5	5[illegible]	93—98xd	93—98
S. Durham Steel & Iron Ord.	1	35/—23/6	10	6[illegible]	1[illegible] - 1[illegible]	1[illegible]
Do ... ... Cum. pref.	1	20/6—19/-	6	5[illegible]	[illegible] - 1[illegible]	1[illegible]
Do. ... ... Deb.	Stk.	95—98	4[illegible]	4[illegible]	90—92	90 92
Steel Co. of Scotland ... Ord.	10	12[illegible]—8[illegible]	5	5[illegible]	8[illegible]—9	8[illegible]—9½
Stewarts & Lloyds Pref. ord.	10	21[illegible]—20	10	4[illegible]	20—21	19
Do. ... ... Cum. pref.	10	14[illegible]—13[illegible]	6	4[illegible]	11[illegible] -13[illegible]	13[illegible]
Stone (J.) ... ... Cum. pref.	10	9[illegible]—9	5	5[illegible]	8[illegible]—9[illegible]xd	9[illegible]
United States Steel ... Ord.	100$	71[illegible]—50	3	4[illegible]	61—61[illegible]	63[illegible]
Do. ... ... Cum. pref.	100$	113[illegible] -104[illegible]	7	6[illegible]	112—113	114
Vickers Ltd. ... ... Ord.	1	43/6—33/3	12[illegible]	6[illegible]	1[illegible] - 1[illegible]	1[illegible]
Do. ... ... Pref.	Stk.	106[illegible]—99	5	5	104—107	100[illegible]
Do. ... ... Deb.	Stk.	100[illegible]—91[illegible]	4	4[illegible]	96[illegible]—98[illegible]	93
Weardale Steel ... Def. ord.	1	21/—17/-	6	7[illegible]	[illegible] - [illegible]	[illegible]
Do. ... ... Cum. pref.	1	20·1[illegible]—18/-	6	6[illegible]	1[illegible] —1	[illegible]
Do. ... ... Deb.	Stk.	77—73[illegible]	4	—	77—80	—
Workington Iron & Steel Ord.	1	16/6—12/3	6	8[illegible]	[illegible] - [illegible]	[illegible]

SHIPBUILDING AND MARINE ENGINEERING.

Armstrong, Whitworth Ord.	1	60 —39/-	12[illegible]	6	1[illegible]—2[illegible]	1[illegible]
Do. ... ... Cum. pref.	5	95.—84/6	4	4[illegible]	4[illegible]—4[illegible]	4[illegible]
Do. ... ... Deb.	Stk.	98[illegible]—94[illegible]	5	5[illegible]	96—98	89[illegible]
Beardmore (W.) ... ... Deb.	100	96[illegible] 91[illegible]	4[illegible]	4[illegible]	94—96	94[illegible]
Brown (John) ... ... Ord.	1 (15s. pd.)	23.—17/9	10	6[illegible]	[illegible] - [illegible]xd	1[illegible]
Do. ... ... Cum. pref.	10	10[illegible]—9[illegible]	5	5[illegible]	9[illegible]—10xd	9[illegible]
Cammell Laird ... ... Ord.	5	3[illegible]—2[illegible]	7[illegible]	8	3[illegible]—4[illegible]	4[illegible]
Do. ... ... Cum. pref.	5	92/6—79/-	5	6	4[illegible]—4[illegible]	4[illegible]
Do. ... ... Deb.	100	90[illegible]—84[illegible]	4[illegible]	5	92—94	91
Dunlop (Jas.) ... ... Ord.	1	18/6—17/6	Nil.	—	[illegible] - [illegible]	[illegible]
Do. ... ... Cum. pref.	1	1[illegible] - [illegible]	6	7[illegible]	[illegible]	[illegible]
Fairfield Shipbldg Cum. pref.	10	10 7[illegible]	6	8[illegible]	—	7[illegible]
Fleming & Ferguson ... Ord.	10	20[illegible]—12[illegible]	10	6[illegible]	14[illegible]—14[illegible]	15
Gray Wm. ... ... Deb.	100	100[illegible]—100	4[illegible]	4[illegible]	100-102	100
Henderson D & W's Cum. pref.	1	[illegible] - [illegible]	5	12	[illegible] - [illegible]	[illegible]
Richardsons Westgarth Ord.	1	3/6—1/9	Nil.	Nil.	[illegible] - [illegible]	[illegible]
Do. ... ... Cum. pref.	1	9 9—4/3	Nil.	Nil.	[illegible] - [illegible]	[illegible]
Do. ... ... Deb.	Stk.	70—58	4[illegible]	6[illegible]	55 - 58	69[illegible]
Simons (W.) ... Cum. pref.	10	10[illegible]—10	5	4[illegible]	10[illegible] -10[illegible]	10[illegible]
Stephenson (R.) ... ... Ord.	1	66[illegible]—53	Nil.	Nil.	—	—
Do. ... ... Deb.	Stk.	66[illegible]—63	Nil.	Nil.	—	—
Swan, Hunter & W. R. ... Ord.	1	19 10[illegible]-16/-	†10	10[illegible]	[illegible] - 1	1[illegible]
Do. ... ... Cum. pref.	1	19/9—17/9	5	5[illegible]	[illegible] - 1	[illegible]
Do. ... ... Deb.	Stk.	90[illegible]—88	4[illegible]	—	90—93	—
Thornycroft (John I.) ... Ord.	1	27.6—12/6	—	—	[illegible] - [illegible]	[illegible]
Do. ... ... Cum. pref	1	19 3—11/3	6	7[illegible]	[illegible] - [illegible]	[illegible]
Do. ... ... Deb.	100	94—91	5	5[illegible]	88—92	94
Wallsend Slipway ... Ord.	1	1[illegible] - [illegible]	10	—	1[illegible] -1[illegible]	—
Do. ... Cum. pref.	1	20 —20/-	5	—	[illegible] -1[illegible]	[illegible]

J. CRICHTON & Co

SHIPBUILDERS & ENGINEERS.

TELEGRAMS "YACHT" CHESTER.

STEAM & MOTOR YACHTS: LAUNCHES, TUGS, BARGES, STERN WHEEL & SHALLOW-DRAUGHT VESSELS.

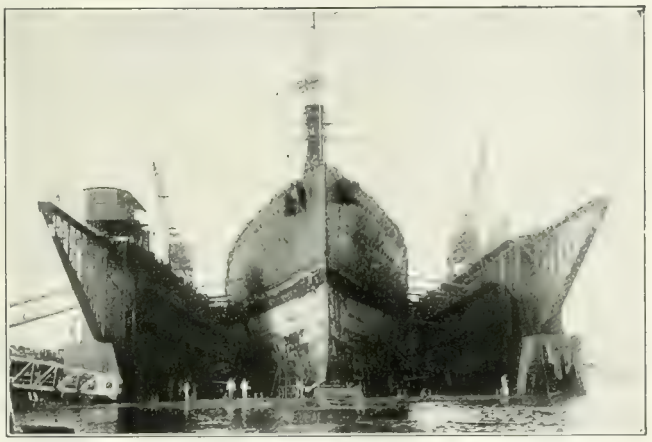
SALTNEY SHIPYARD, CHESTER.

ALL TYPES OF COMMERCIAL CRAFT FOR RE-ERECTION ABROAD.

TELEPHONE 715 CHESTER.

HEAD OFFICE TOWER BLDG., LIVERPOOL.

ENGINE WORKS DERBY ROAD, LIVERPOOL.



BRIGGS' BITUMINOUS COATINGS

HAVE BEEN APPLIED TO

THE TWO LARGEST FLOATING DOCKS, THE FOUR LARGEST VESSELS, AND THE TWO BIGGEST BRIDGES

IN THE WORLD.

SPECIFY AND INSIST ON GETTING **BRIGGS'.**

THE WORLD'S RECORD ANTI-CORROSIVES.

Patentees and Sole Manufacturers:

W. BRIGGS & SONS, LTD.,

DUNDEE & LONDON.

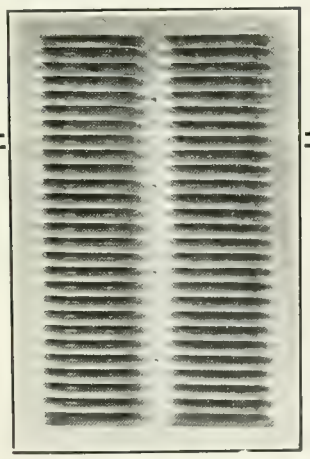


Illustration of Galvanized Steel Jalousie made at our works to suit Admiralty requirements.

ON ADMIRALTY LIST.

Our works are equipped for the manufacture of all kinds of sheet iron work. Ventilators, tanks, lamps, galley gear, etc.

THOS. GRIEVE & SONS,

NORTH SHIELDS.

(PATENT) "LION" (PATENT)

METALLIC PACKING

FOR STEAM OR WATER.

EXPANDING TYPE.

The ONLY packing that offers at the same time highest packing efficiency and longest wearing quality.

The metal studs inserted at regular intervals form a complete metallic wearing surface that prolongs the life of the packing, reduces friction to the minimum, and prevents scoring of the rod.

The packing is a combination packing, made of finest selected materials, and so constructed as to operate automatically, giving tight packing efficiency with no unnecessary pressure on the rod.

Highest packing efficiency plus longest wearing quality.

Do you realize the value of such a combination in a packing?

SEND FOR CATALOGUE AND SAMPLES.

BEWARE OF IMITATIONS: LOOK FOR THE THIN RED LINE.

JAMES WALKER & Co., Ltd.,

LION WORKS, GARFORD ST.,

WEST INDIA DOCK ROAD, LONDON, E.

CAMBRIAN NAVIGATION SMOKELESS STEAM COAL.

(On British and Foreign Admiralty Lists.)

RECOGNISED AS THE BEST QUALITY
— OF CARDIFF STEAM COAL. —

PROPRIETORS:

CAMBRIAN COLLIERIES LTD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
London Offices: 31, GREAT ST. HELENS.

Telegraphic Addresses: "Cambrian, Cardiff." "Glamorgan, London."
Telephones: Cardiff 3280; London 4316 & 4317 Avenue.

SHIPPERS:

THOMAS & DAVEY, CAMBRIAN BLDGS., CARDIFF.

'HOOD'S MERTHYR' STEAM COAL

(On British and Foreign Admiralty Lists.)

FOUNDRY AND FURNACE COKE.

SULPHATE OF AMMONIA, TAR.
No. 2 & 3 RHONDDA LARGE, THRO & SMALL COALS.

PROPRIETORS:

GLAMORGAN COAL CO., LD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
London Offices: 31, GREAT ST. HELENS.

Telegraphic Addresses: "Glamorgan, Cardiff." "Glamorgan, London."
Telephones: Cardiff 3280; London 4316 & 4317 Avenue.

SHIPPING AGENTS:

LYSBERG, LTD., CAMBRIAN BLDGS., CARDIFF.

NAVAL MERTHYR SMOKELESS STEAM COAL.

(On British and Foreign Admiralty Lists.)

PROPRIETORS:

NAVAL COLLIERY CO. (1897) LD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
London Agency: 21, ST. MARY AXE.

Telegraphic Address: "Naval, Cardiff."
National Telephone: 3280. London 3304 City.

SHIPPING AGENTS:

L. GUERET, LTD., CAMBRIAN BLDGS., CARDIFF.

BRITANNIC MERTHYR STEAM COAL.

PROPRIETORS:

BRITANNIC MERTHYR COAL CO., LTD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
Telephone: Cardiff 3280. Telegrams: "Britannic, Cardiff."

SHIPPING AGENTS:

THOMAS & DAVEY, CAMBRIAN BLDGS., CARDIFF.

D. DAVIS & SONS, LIMITED,

SHIPPERS OF

"COEDELY"

(Welsh Navigation Steam Coal Co., Ltd.)

No. 2 RHONDDA COAL
For Bunkering & Manufacturing.

No. 3 RHONDDA COAL
High-class Smiths' and Coking Coal.

BITUMINOUS COAL
Hard, and Free from Small.

STEAM COAL.

COKE AND BY-PRODUCTS.

"FERNDALE"

(D. DAVIS & SONS, LIMITED.)

FERNDALE COAL is produced from the 9 Pits of the **Ferndale Collieries**, which work one unbroken Mineral area of nearly seven square miles in the Rhondda Valleys, and are situated within that portion of the South Wales Coalfield whence the best Smokeless Steam Coals are worked.

FERNDALE COAL is noted for its **Uniform Quality, Great Evaporative Power, Purity, and Durability.**

FERNDALE COAL is used extensively by the British and other Admiralties, and is shipped to all the principal Coaling Depots. It is a favourite Coal with Steamship Companies, to whom Speed and Smokelessness are important.

"Griffin-Nantyglo"

(John Lancaster & Co., Ltd.)

GRIFFIN-NANTYGLO STEAM COAL from the **Western Valleys of Monmouthshire** bears the highest reputation for **Locomotive & Bunkering Purposes.**

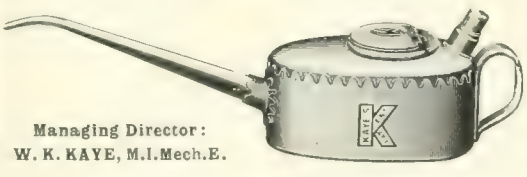
GRIFFIN - NANTYGLO WASHED COALS include: — **Nuts, Peas, Beans, and Duff**, and are celebrated for their **Uniform Purity.**

SHIPPING PORTS: Cardiff, Barry, Penarth, Newport & Port Talbot. CHIEF OFFICES: Cymric Buildings, Cardiff.
LONDON OFFICES: 138, Leadenhall Street, E.C. PARIS (Office of Concessionaire): 22, Rue St. Augustin. Telegrams: "Ferndale," Cardiff, London and Paris.

KAYES' Seamless Oil Cans.

LATEST PATENT SERRATED STEEL.

ALL BRITISH MADE.



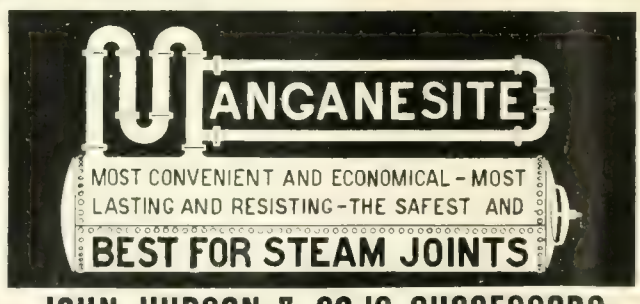
80,000 SUPPLIED to the BRITISH NAVY.

Managing Director:
W. K. KAYE, M.I.Mech.E.

Also in COPPER or BRASS for electrical purposes.

Sole Makers—

JOSEPH KAYE & SONS, LTD., LOCK WORKS, LEEDS, and 93, High Holborn, LONDON, W.C.



JOHN HUDSON & CO.'S SUCCESSORS

15, VICTORIA WAREHOUSES, MANSELL STREET, LONDON, E.

The "S. & S. R." is published every Thursday.

Buyers' Guide.

LIST OF THE LEADING MAKERS OF SHIPBUILDING & SHIPYARD & DOCK MACHINERY, APPLIANCES, PLANT & STORES.

ACCOMMODATION LADDERS—
Linkleter's Patent Ship Fittings Co., Hudson St., North Shields.

ACETYLENE—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

AERIAL ROPEWAYS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

AIR COMPRESSORS—
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.

AIR PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Contraflo Condenser & Kinetic Air Pump Co., Ltd., 3, Central Buildings, Westminster, S.W.
Dawson & Downie, Elgin Works, Clydebank.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.
Weir, G. & J., Ltd., Cathcart, Glasgow.

ALUMINIUM GOODS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ALUMINIUM PAINT—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ANCHORS—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Spencer, John, & Sons, Ltd., Steel Works, Newburn-on-Tyne.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

ANTI-CORROSIVE COMPOSITIONS—
Briggs, W., & Sons, Ltd., Dundee.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Milburn, A., & Co., Sunderland.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FOULING COMPOSITION—
Holzapfels, Ltd., Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FRICTION METALS—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., East Greenwich.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water St., Liverpool.

ARMOUR PLATES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Brown, John, & Co., Ltd., Atlas Works, Sheffield.

ASBESTOS FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ASBESTOS GOODS—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

ASH BAGS—
Speedings Ltd., Sail Works, Sunderland.

ASH BINS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ASH DISCHARGING APPLIANCES—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Trewent & Proctor, F. J., Ltd., 43, Billiter Buildings, E.C.

AWNINGS—
Speedings Ltd., Sail Works, Sunderland.

BARROWS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BARROWS (Cargo)—
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

BEDDING & NAPERY—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

BEMAL CONDENSER TUBES—
The Yorkshire Copper Works, Ltd., Leeds.

"BITUMASTIC" ENAMEL MANUFACTURERS—
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

BLINDS—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.

BLOWERS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.

BOILERS—
Central Marine Engine Works, West Hartlepool.
Elliot & Jeffery, East Dock, Cardiff.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-84, Fenchurch Street, E.C.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

BOILER CIRCULATORS—
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.

BOILER CLEANER—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COMPOSITION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COVERING—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

BOILER MOUNTINGS—
Cockburns Ltd., Cardonald, Nr Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

BOILER PLATES (Steel)—
Leeds Forge Co., Ltd., Leeds.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

BOILER PRESERVATIVE—
Atlas Preservative Co., Ltd., Deptford, S.E.

BOILER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BOLTS AND NUTS—
Coventry Chain Co., Ltd., Coventry.

BORING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd. Elswick Works, Newcastle-upon-Tyne.
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.

BRASS & COPPER FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BRASS & COPPER RODS—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

BRASS FOUNDERS—
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Williams, Wm., Alexandra Brass Foundry, Cardiff.

BRASS NAME-PLATES—
Metograph Co., 280, Cathedral Street, Glasgow.
Rennie & Co., North Greenhill Road, Paisley.

BRASS TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BRASSWORK—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BRONZE (Manganese)—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Delta Metal Co., Ld., E. Greenwich, London, S.E.
Stone, J., & Co., Ltd., Deptford, London, S.E.

BUCKETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BUNTING—
Riley, Edward, & Co., Leeds.

BUOYANT DECK SEATS—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.

BUOYS—
Linkleter's Patent Ship Fittings Co., Hudson Street, North Shields.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

CABINET MAKERS—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

CABLES (Chains)—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

CAISSONS & DOCK GATES—
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

CALORIFIERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

CAPSTANS (Electric)—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Engine Works, Elswick.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

CARGO BLOCKS—
Higginson & Co., 7, Hurst Street, Liverpool.

CARPETS—
Stewart, Archibald & Co., 40-48, Union St., Glasgow.

CASE HARDENING BOXES—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING COMPOSITION—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING OIL—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CAST BRASS PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

CASTINGS (Steel)—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Steel Works, Elswick.
Brown, John, & Co., Atlas Works, Sheffield, and Clydebank, Nr. Glasgow.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

CASTINGS (Steel, Iron and Brass)—
Chambers, John, Ltd., Lowestoft.
Darlington Forge Co., Ltd., Darlington.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McRobie, John & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

CHAINS—
"The Coventry" Chain Co., Ltd., Spon End Works, Coventry.

CHRONOMETERS—
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.

COAL—
Britannic Merthyr Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Cambrian Collieries, Ltd., Cambrian Bldgs., Cardiff.
Davis, D., & Sons, Ltd., Cymric Bldgs., Cardiff.
Glamorgan Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Harrisons (London), Ltd., 66, Mark Lane, E.C.
Naval Colliery Co. (1897), Ltd., Cambrian Bldgs., Cardiff.
Powell Duffryn Steam Coal Co., Ltd., Cardiff.

COAL-LOADING PLANT—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

COMPASSES (Ship)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.

CONDENSERS—
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Contraflo Condenser & Kinetic Air Pump Co., Ltd., 3, Central Buildings, Westminster, S.W.
Dawson & Downie, Elgin Works, Clydebank.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

CONDENSER TUBES (Brass and Copper)—
The Yorkshire Copper Works, Ltd., Leeds.

CONTROLLERS & CONTROL GEAR—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

CONVEYORS—
Armstrong, Sir W. G., Whitworth & Co., Ltd. Elswick Works, Newcastle-upon-Tyne.
Mather & Platt, Ltd., Manchester.

COOKING APPARATUS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields.

COPPER PIPES—
Yorkshire Copper Works, Ltd., Leeds.

COPPERSMITHS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

COPPER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

CORK INSULATION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Newalls Insulation Co., 31, Mosley Street, Newcastle-on-Tyne.

CORRUGATED IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

COUNTER (Engine)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

CRAB WINCHES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

CRANES—
Ransomes & Rapier, Ltd., 32, Victoria Street, London, S.W.

CUTTERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

CYLINDERS (Copper)—
The Yorkshire Copper Works, Ltd., Leeds.

DELTA METAL—
Delta Metal Co., Delta Works, East Greenwich, S.E.

DERRICKS & DAVITS (Tubular Steel)—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

DISTILLING APPARATUS—
Royles Ltd., Irlam, Nr. Manchester.

DIVING APPARATUS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

DOCK & SHIP LIGHTING—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

DOCK GATES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Engine Works, Elswick.
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

DOORS (Watertight)—
British Thomson-Houston Co., Ltd., Rugby.
Stone, J., & Co., Ltd., Deptford, S.E.

BUYERS' GUIDE—*continued.*

DREDGE PLANTS—
[illegible], Glasgow.
[illegible], W[illegible] & Co., Ltd., Rutherglen, Nr. Glasgow.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Glasgow.

DREDGING—
[illegible] & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

DRILLING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

DRILLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
[illegible], Ltd., St. Leonards-on-Sea.

DRILLS (Pneumatic and Electric)—
[illegible] Stone Metallic Packing Co., Ltd., Bradford.

DROP FORGINGS & STAMPINGS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

DRY FITTINGS (Laundry)—
[illegible], J., & Co., Salford, Manchester.

DYNAMOS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRIC CRANES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Engine Works, Elswick.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [Edinburgh.
Mactaggart, Scott & Co., Ltd., Loanhead,
Mather & Platt, Ltd., Manchester
[illegible] & Rapier, Ltd., 32, Victoria Street, London, S.W.

ELECTRIC DERRICKS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRIC DYNAMOS & MOTORS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC FITTINGS—
Durham, Churchill & Co., Grimesthorpe, Sheffield.

ELECTRIC HEATING & COOKING APPARATUS—
British Thomson-Houston Co., Ltd., Rugby.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

ELECTRIC LAMPS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.
McGeoch, Wm., & Co. Ltd., 28, West Campbell St., Glasgow.

ELECTRIC LIGHTING—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC-LIGHTING PLANT—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC MOTORS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC WIRES—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRICAL CONTRACTORS—
Holmes. J. H., & Co., Portland Road, Newcastle-on-Tyne.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Glasgow.
Martin, W. C., & Co., 10, West Campbell Street,
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL ENGINEERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.

ELECTRICAL ENGINEERS (*cont.*)—
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. [on-Tyne.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL INSTRUMENTS (Ammeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

ELECTRICAL INSTRUMENTS (Circuit Breakers)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Relays)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Voltmeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

EMERY WHEELS—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

ENAMEL MANUFACTURERS—
Holzapfels, Ltd., Newcastle-on-Tyne.
Wailes, Dove & Co., Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

ENGINE (Electric Light)—
Belliss & Morcom, Ltd., Birmingham.
Greenwood & Batley, Ltd., Albion Works, Leeds.

ENGINES (Land)—
Chambers, John, Ltd., Lowestoft.

ENGINES (Marine)—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James,& Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

ENGINE & DECK STORES—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street,

ENGINE AUXILIARIES—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

ENGINE FITTINGS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ENGINE-ROOM OUTFITS—
Grieve, T., & Sons, Bedford Street, North Shields.
Newalls Insulation Co., 31, Mosley Street, Newcastle-on-Tyne.

ENGRAVERS—
Brown, Robert, & Co., 12, Espedair St., Paisley.

EVAPORATORS—
Central Marine Engine Works, West Hartlepool.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

EXPLOSIVES—
Armstrong, Sir W. A. Whitworth & Co., Ltd., [Scotswood Works.

EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)—
Delta Metal Co., Ltd., E Greenwich, London, S.E.

FANS—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Hogan & Wardrop, 2, Gresham Buildings, Basinghall Street, London, E.C.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue. London, E.C.

FEED-WATER HEATERS—
[illegible] Engineering Co., Beresford Lane, Cardiff.
Central Marine Engine Works, West Hartlepool.
Contraflo Condenser & Kinetic Air Pump Co., Ltd., 3, Central Buildings, Westminster, S.W.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

FILES—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FILTERS (Marine)—
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Cockburns Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.

FIREBARS—
Liverpool Patents Co., Ltd., Derby Square, James Street, Liverpool.

FIRE EXTINGUISHERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

FIRE-FIGHTING APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Sheffield.

FLAGS—
Riley, Edward, & Co., Leeds.
Speedings, Ltd., Sail Works, Sunderland.

FLOATING DOCKS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow. [Scotland.
Hamilton, Wm., & Co., Ltd., Port Glasgow,
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

FLOOR COVERING—
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.

FORCED DRAUGHT—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Howden, J. & Co., Ltd., Scotland Street, Glasgow.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FORGING PRESSES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Mactaggart, Scott & Co., Ltd., Loanhead,

FORGINGS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Steel Works, Elswick.
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Hingley & Sons, Ltd., Netherton Iron Works, Staffs.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

FORGINGS (Bronze)—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

FORGINGS (Steel)—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FUMIGATORS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

FURNACE BRIDGES—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

FURNACES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Deighton's Patent Flue & Tube Co., Ltd., Vulcan Works, Pepper Road, Leeds.
Leeds Forge Co., Ltd., Leeds.
Piggott, T., & Co., Ltd., Birmingham.

FUSES—
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

GALLEY GEAR—
Grieve, T., & Sons, Bedford Street, North Shields.

GALVANIZERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

GAS ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mather & Platt, Ltd., Manchester.

GAUGES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

GEAR CUTTING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

GEARING—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

GEARS—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

GEARS (Noiseless or Silent)—
British Thomson-Houston Co., Ltd., Rugby.
Brown, David, & Sons (Hfd.), Ltd., Huddersfield.

GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

GRINDING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

GRINDING WHEEL MACHINES—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

HEATING APPARATUS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

HEATING ENGINEERS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Matthews & Yates, Ltd., Swinton, Manchester.
Royles Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd. 43, Lower Mosley Street, Manchester.

HELM SIGNAL TELEMOTORS—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HIGH SPEED DRILLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Atlas Works, Sheffield.

HIGH SPEED STEEL—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Brown, John, & Co., Atlas Works, Sheffield.

HOISTS—
Mather & Platt, Ltd., Manchester.
Waygood-Otis, Ltd., Falmouth Road, S.E.

BUYERS' GUIDE—*continued.*

HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, [Bermondsey, London, S.E.

HYDRAULIC CRANES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Engine Works, Elswick.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HYDRAULIC MACHINERY—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Waygood-Otis, Ltd., Falmouth Road, S.E.

HYDRANTS—
McRobie, John, & Sons, 94, Elliott Street,

INDIARUBBER—
Heinke, C. E., & Co., 88, 89, Grange Road, Cranstonhill, Glasgow.

INDICATORS—
Robinson, A., & Co., Ltd., Bootle, Liverpool. Bermondsey, London, S.E.

INDUCED DRAUGHT—
Davidson & Co., Ld., Sirocco Eng'n'g W'rks, Belfast
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

INSULATIONS—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Liverpool.
Liverpool Refrigeration Co., Ltd., Colonial House,

IRON ROOFS AND BUILDINGS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

JOINTING MATERIAL (Manganesite)—
Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell Street, E.C.

LAMPS AND LIGHTS—
Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20,

LATHES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne. Cambridge Street, Glasgow.

LAUNCHES—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

LAUNDRY MACHINERY—
Bradford, T., & Co., Salford, Manchester.

LAVATORY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

LEAD (Sheets and Pipes)—
Rimer Bros., Newcastle-on-Tyne.

LEAD (White and Red)—
Rimer Bros., Newcastle-on-Tyne.

LIFEBELTS AND BUOYS—
Speedings Ltd., Sail Works, Sunderland.

LIFTS (Window)—
Laycock, W. S., Ltd., Victoria Works, Millhouses,

LIFTS AND HOISTS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Waygood-Otis, Ltd., Falmouth Road, S.E. Sheffield.

LIGHTERAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

LIGHTERS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. [Glasgow.
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

LOCKS—
Kaye, Joseph, & Sons, Ltd., Leeds.

LOCOMOTIVE TUBES (Copper & Brass)—
The Yorkshire Copper Works, Ltd., Leeds.

LUBRICATORS—
McRobie, John, & Sons, 94, Elliott Street, [Cranstonhill, Glasgow.

MACHINE TOOLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Scriven & Co., Leeds Old Foundry, Leeds.

MACHINERY NAME PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

MAGNESIA—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

MARINE ENGINEERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-on-Tyne.
Bailey, C. H., Newport, Mon. [Barry Docks.
Barry Graving Dock & Engineering Co., Ltd.,
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Delegación de la Compañia Trasatlantica, Cadiz.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliot & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.

MARINE ENGINEERS *(contd).—*
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Livingstone & Cooper, Ltd., Hessle, Hull.
Mountstuart Dry Docks, Ltd., Cardiff.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Shearman, John, & Co., Ltd., Cardiff.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

MARINE GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street,

MARKING-OFF TABLES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds. Liverpool

MATTRESSES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

METALLIC PACKING—
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.
United States Metallic Packing Co., Ltd., Bradford

METAL SPINNINGS—
Levick, John, Alma Street, Aston, Birmingham.

METALS (Patent)—
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., Delta Works, East Greenwich.

MILLING CUTTERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

MOTOR BOATS—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

MOTOR STARTING AND CONTROL GEAR—
Holmes, J. H., & Co., Portland Road, Newcastle-[on-Tyne.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

NAVAL ARCHITECTS' SUPPLIES—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

OIL CANS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ECONOMISERS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL-FUEL INSTALLATION—
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL IMPORTERS & BLENDERS—
Rimer Bros., Newcastle-on-Tyne.

PACKING—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Walker, Jas. & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E.

PAINTS—
Briggs, W., & Sons, Ltd., Dundee.
Cocks, Harry, & Co., Cardiff.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Wailes, Dove & Co., Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

PANELLING—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

PATENT HAWSE PIPE AND DECK FLANGE—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

PERFORATED METALS—
Braby F., & Co., Ltd., Eclipse Works, Glasgow.
Piggott, T., & Co., Ltd., Birmingham.

PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
The Yorkshire Copper Works, Ltd., Leeds.

PLANING MACHINES for Plate Edges—
Scriven & Co., Leeds Old Foundry, Leeds.

PLATE BENDING ROLLS—
Scriven & Co., Leeds Old Foundry, Leeds.

PORCELAIN ENAMELLED CAST IRON—
Levick, John, Alma Street, Aston, Birmingham.

PROPELLERS—
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft. [Liverpool,
Crichton, C. & H., Ltd., Huskisson Engine Works.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

PROPELLER BLADES—
Billington & Newton, Ltd., Longport, Staffs.
Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

PUBLICATIONS—
"Shipbuilding and Shipping Record," Queen Anne's Chambers, Westminster, London, S.W.

PULLEY BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Cardiff.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

PUMPING ENGINES—
Central Marine Engine Works, West Hartlepool.

PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineer- [ing Works, Bedford.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Davey & Co. (London). Ltd., 88, West India Dock Road, E.
Dawson & Downie, Elgin Works, Clydebank.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Hall, J. P., & Sons, Ltd., Peterborough.
Mather & Platt, Ltd., Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

PUNCHING AND SHEARING MACHINES—
Scriven & Co., Leeds Old Foundry, Leeds.

RADIATORS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
British Thomson-Houston Co., Ltd., Rugby.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

RADIATOR TUBES—
The Yorkshire Copper Works, Ltd., Leeds.

REAMERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

REFRIGERATING MACHINERY—
Hall, J. & E., Ltd., Dartford Ironworks, Kent.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.
Sterne, L. & Co., Ltd., Crown Iron Works, Glasgow

RESCUE APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

REVERSING ENGINES (Direct-Acting Type)—
Brown Brothers & Co., Ltd., Rosebank Iron [Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

RHEOSTATS & RESISTANCES (all kinds)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ROPE-CUTTING MACHINES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROPES (Wire)—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROUND AND OVAL HOLE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

RUBBER GOODS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUBBER HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUSTLESS IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SAFE MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford Street, Birmingham.

SALOON LIGHTS—
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Laycock, W. S., Ltd., Victoria Works, Millhouses,

SALVAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

SANITARY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

SCREWING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

SHAFTING—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

SHAPING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Greenwood & Batley, Ltd., Albion Works, Leeds.

SHEAVES—
Higginson & Co., 7, Hurst Street, Liverpool.

SHEERS, TRAVERSING (Land and Floating)—
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.

SHIP APPLIANCES—
Linkleter's Patent Ship Fittings Co., 20, Percy Street, Tynemouth.

SHIP BROKERS—
Hall, Edward, Cardiff.
Pinkney, Thos., & Sons, Sunderland.
Walford, Leopold & Co., 29, Gt. St. Helens, E.C.

BUYERS' GUIDE—*continued.*

SHIPBUILDERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chaloner, Wm., & Co., Ltd., Kirkheaton, Nr. Glasgow.
Charlton, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.
Delegación de la Compañía Trasatlantica Cadiz.
Doxford, Wm., & Sons, Ltd., Sunderland.
Gray, Wm., & Co., Ltd., West Hartlepool.
Hamilton, Wm., & Co., Ltd., Port Glasgow.
Harland & Wolff, Ltd., Belfast.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Liverpool Screw Co., Ltd., Hoylake.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

SHIP CONSTRUCTION—
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.

SHIP FURNISHINGS & FITTINGS—
Cocks, Harry, & Co., Cardiff.
Davey & Co. (London), Ltd., 88, West India Dock Road, E.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Street, North Shields.
Linkleter's Patent Ship Fittings Co., Hudson
Loveridge, Ltd., Cardiff.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.
Waygood-Otis, Ltd., Falmouth Road, S.E.

SHIP LAVATORIES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

SHIP PLATES (Steel)—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

SHIP REPAIRERS—
Bailey, C. H., Newport, Mon.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliot & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Grayson, H. & C., Ltd., Royal Liver Building, Liverpool.
Harland & Wolff, Ltd., Belfast.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Mountstuart Dry Docks, Ltd., Cardiff.
Shearman, John, & Co., Ltd., Cardiff.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
Yarrow & Co., Ltd., Glasgow.

SHIPS' ELECTRIC FITTINGS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

SHIPS' LAUNDRIES—
Bradford, T., & Co., Salford, Manchester.

SHIPS' TELEGRAPHS—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Robinson, A., & Co., Ltd., Bootle, Liverpool.

SIGNAL FLASHING AND CABIN LAMPS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

SILICATE-COTTON SPECIALITIES—
Walker, Jas., & Co., 11, Bishop Court, Anderston, [Glasgow.

SKYLIGHT & LIFTING GEARS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

SLAG WOOL (Silicate Cotton)—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

SLEWING GEAR (for Ships' Derricks)—
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

SMITHS' HEARTHS—
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

SOLDER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SOUNDING MACHINES—
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.

SPEAKING TUBES—
Durham, Churchill & Co., Grimesthorpe, Sheffield.

SPELTER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPIRAL SPRINGS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

STAMPINGS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Delta Metal Co., Ltd., East Greenwich. [Steel Works, Elswick.

STAYBOLTS—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

STEAM-FITTING MANUFACTURERS—
Billington & Newton, Ltd., Longport, Staffs.
Royles Ltd., Irlam, Nr. Manchester.

STEAM-HEATING—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

STEAM KETTLES—
Royles Ltd., Irlam, Nr. Manchester.

STEAM PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

STEAM TRAPS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

STEAM TURBINES—
Belliss & Morcom, Ltd., Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

STEAMSHIP SPECIALITIES—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,

STEEL—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL BARGES—
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

STEEL BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Seamless Steel Boat Co., Ltd., Wakefield.

STEEL MAKERS—
Brown, John, & Co., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL PLATES AND SHEETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

STEERING-GEAR— [Works, Edinburgh.
Brown Brothers & Co., Ltd., Rosebank Iron
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hastie, John, & Co., Ltd., Greenock.
Higginson & Co., 7, Hurst Street, Liverpool.

STEERING GEAR (Buffers)—
Loveridge, Ltd., Cardiff.

STEERING TELEMOTORS—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

STOCKS AND DIES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

STORES (Ship)—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

STRONG ROOM MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRONG ROOM DOOR MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRUCTURAL ENGINEERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SUPERHEATERS—
Central Marine Engine Works, West Hartlepool.
Superheater Corporation, Ltd., Palace Chambers, 9, Bridge Street, Westminster, S.W

SUSPENSION BULB FURNACE—
Leeds Forge Co., Ltd., Leeds.

SWINGBRIDGES—
Armstrong, Sir W. G., Whitworth & Co., Ltd.,

SWITCHBOARDS— Engine Works, Elswick.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Eng'r'ing Co., Ld., Sunderland.

SWITCHGEAR & INSTRUMENTS—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

SYRENS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

TANK TOP COVERING—
Hamilton, Archd., & Co., Possilpark, Glasgow.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

TANKS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Mather & Platt, Ltd., Manchester.

TARPAULINS—
Spencings Ltd., Sail Works, Sunderland.

TELEPHONES—
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

TESTING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

TIMEPIECES—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge St., Glasgow.

TOOL STEEL—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Atlas Works, Sheffield.

TOWAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.
Tilbury Contracting & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

TUBE PLATE CUTTING-OUT MACHINES—
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.

TUBES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
The Yorkshire Copper Works, Ltd., Leeds.

TUBES (Brass and Copper)—
Yorkshire Copper Works, Ltd., Leeds.

TURBINE OIL—
Rimer Bros., Newcastle-on-Tyne.

TURBINES—
Belliss & Morcom, Ltd., Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.

TWIST DRILLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Atlas Works, Sheffield.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

UPHOLSTERERS—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

VACUUM CLEANERS—
The British Vacuum Cleaner Co., Ltd., 77, Parsons Green Lane, Fulham, S.W.

VALVES—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
Royles Ltd., Irlam, Nr. Manchester.

VALVE RE-SEATER—
Brooke, G., Lloyds Bank Chambers, Docks, Cardiff.
Greenwood & Batley, Ltd., Albion Works, Leeds.

VENTILATORS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.
Loveridge, Ltd., Cardiff.
Low, Archibald, & Sons, Ltd., 78, Merkland St., Partick, Glasgow.

WAR MATERIAL—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Ordnance, Elswick.
Brown, John, & Co., Atlas Works, Sheffield.

WELDING & CUTTING—
Carbic Ltd., 52, Holborn Viaduct, London, E.C.

WINCHES— [ing Works, Bedford.
Allen, W. H., Son & Co., Ltd., Queen's Engineer-
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Higginson & Co., 7, Hurst Street, Liverpool.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

WINDLASSES—
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

WIRE-ROPE COMPRESSORS—
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

WOOD-WORKING MACHINERY—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Wadkin & Co., North Evington, Leicester.

WORK TABLES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

YACHT BUILDERS—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Yarrow & Co., Ltd., Glasgow.

ZINC—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

P & O

Under Contract with His Majesty's Government.

Frequent and Regular

Passenger Services

INDIA, CEYLON, STRAITS, CHINA, JAPAN, AUSTRALASIA.

Also EGYPT and MEDITERRANEAN.

For Berths, Rates of Passage Money and Plans of the Steamers, apply P. & O. S. N. Co., 122, Leadenhall Street, E.C., or Northumberland Avenue, W.C., LONDON.

R.M.S.P. & P.S.N.C.

TO THE PENINSULA, MADEIRA, CANARY IS.

BRAZIL, RIVER PLATE.

CHILE, PERU, ECUADOR,

WEST INDIES,

PANAMA CANAL,

BRITISH & DUTCH GUIANA, COLOMBIA, COLON, AND THROUGH PANAMA CANAL TO PACIFIC PORTS.

MOROCCO.

For particulars apply—

THE ROYAL MAIL STEAM PACKET COMPANY.
THE PACIFIC STEAM NAVIGATION COMPANY.
LONDON—18, Moorgate Street, E.C. and 32, Cockspur Street, S.W.
LIVERPOOL—31, James Street.

THE NEW ZEALAND SHIPPING COMPANY

(Incorporated in New Zealand.) LIMITED.

Direct Service of Swift Royal Mail Steamers.

ROUTE:

Outwards ... London, Teneriffe, Cape Town, Hobart, New Zealand.
Homewards ... New Zealand, Montevideo and/or Rio de Janeiro, Teneriffe, Plymouth, London.

These Steamers are particularly adapted for the New Zealand trade, are of the highest class, lighted throughout with electric light, and are fitted with every modern improvement for the safety, comfort, and convenience of passengers. The Mail Steamers are fitted with the Marconi System of Wireless Telegraphy.

Steamers are dispatched every fourth Thursday from London and from New Zealand. Passengers booked to Teneriffe and Cape Town, and to Australia and Tasmanian ports *via* Hobart.

HEAD OFFICES—138, Leadenhall Street, London, E.C.

AND CHRISTCHURCH, NEW ZEALAND.

For Freight and Passage apply to—
J. B. WESTRAY & Co., 138, Leadenhall Street, London, E.C.

GLEN AND SHIRE JOINT SERVICE OF STEAMERS

FROM

Antwerp, Middlesbrough, Hull, London,

DIRECT TO

Penang, Singapore, Hong Kong, Shanghai, Kobe, Yokohama and North Pacific Ports.

TAKING CARGO AT THROUGH RATES TO ALL THE PRINCIPAL DESTINATIONS IN THE FAR EAST.

For freight apply to the Brokers:—

McGREGOR, GOW, NORRIS & JOYNER, Ltd.,
4, FENCHURCH AVENUE, E.C.
Tel. No. Avenue 4478. Telegraphic Address: "Eastwardly, London."

"SHIRE" LINE STEAMERS.
Owners:
THE ROYAL MAIL STEAM PACKET CO.
18, Moorgate Street, E.C.
Tel. No. 3720 Wall.
4, Fenchurch Avenue, London, E.C.
Telegraphic Address:—
"Omarishire, London."
Tel. No. 3568 Avenue.

"GLEN" LINE STEAMERS.
For passage apply to the Owners:
GLEN LINE (McGREGOR, GOW, & CO.) LTD.,
1, East India Avenue, London, E.C.
Telegraphic Address:—
"Macgregor, London."
Tel. No. 458 Avenue.

WEST AND SOUTH-WEST COASTS OF AFRICA, AND THE CANARY ISLANDS.

The Royal Mail Steamers of the

AFRICAN STEAM SHIP CO.

(Incorporated 1852 by Royal Charter) and

THE BRITISH AND AFRICAN STEAM NAVIGATION CO., LTD.,

Sailings every WEDNESDAY, THURSDAY and SATURDAY. Taking Passengers at Low Rates.

Elder Dempster and Co., Limited,

Head Office—Colonial House, LIVERPOOL.

And at London, E.C., Manchester, Cardiff, Birmingham, Hamburg, &c.

LAMPORT & HOLT LINE

TO AND FROM

SOUTH AMERICA.

Mail and Passenger Steamers, fortnightly between NEW YORK, BRAZIL and ARGENTINE, calling also WEST INDIES (Trinidad and Barbados).

First Class Fast Cargo Steamers (carrying passengers), regular and frequent Sailings from MIDDLESBRO' and LONDON, MANCHESTER, GLASGOW and LIVERPOOL to BAHIA, RIO DE JANEIRO and SANTOS; to MONTE VIDEO and BUENOS AYRES.
From LIVERPOOL and HAVRE, to WEST COAST OF SOUTH AMERICA.
Between NEW YORK and MANCHESTER.

For descriptive Booklets and all particulars, apply to:—

LAMPORT & HOLT, LIMITED, ROYAL LIVER BUILDINGS, LIVERPOOL.

Telegrams:—"Lamport."

C. H. BAILEY,

Tyne Engine and Ship Repairing Works,

SHIP REPAIRERS & ENGINEERS.

Up-to-Date Plant for Quick and Efficient Repairs.

Oxy-Acetylene and Electric Welding a speciality. Portable and fixed Electric Plant for all purposes.

LIFEBOATS and ICE CHESTS Made and Delivered at Short Notice. Efficiency, Economy and Despatch.

Dry Dock Accommodation: Can Dry dock Four Large Steamers at Barry and Two at Newport at the same time. **Barry Dock Commercial Dry Dock:** Length 867 ft., Width at Top 113 ft. 6 in., at Bottom 100 ft., at Entrance 60 ft.

NEWPORT (MON.) AND BARRY DOCK.

Telegrams: "Bailey, Barry." "Bailey, Newport."
Telephones:—Barry Works: Nat. 36: G.P.O. 9.
Newport Works: Nat. 3. G.P.O. 3.

HILLS' DRY DOCKS and ENGINEERING CO., LD., CARDIFF.

PNEUMATIC CHIPPING & cleaning a speciality.

Dry Dock Owners (3 Docks), Engineers, Ship Repairers and Ironfounders.

UP-TO-DATE WORKS AND DOCKS.

OXY-ACETYLENE AND ELECTRIC WELDING.

PNEUMATIC TOOLS OF ALL KINDS.

Offices & Works at EAST BUTE DOCK.

Telegrams: "Euclid, Cardiff." Telephone No. 2844.

ALPHABETICAL INDEX TO ADVERTISERS.

A

Braby, Fredk., & Co., Ltd. ... ... —
Britannic Merthyr Coal Co., Ltd. ... 18
British Thomson-Houston Co., Ltd. 15
Manufacturing Co., Ltd. 2
Bromell Patents Co., Ltd. ... ... —
Brown, David, & Sons, Ltd. ... ... —
Brown, John, & Co., Ltd. 5
Brown, Robert, & Co., Ltd. ... ... —
Bullivant & Co., Ltd. ... ... —

C

Cambrian Collieries, Ltd. 18
Chadburns Telegraph Co., Ltd. ... —
Chalmers, Wm., & Co., Ltd. ... ... —
Chambers, John, Ltd. 1
Chatwin, Thos., Ltd. ... ... —
Cockburns, Ltd. ... ... —
Cocks, Harry, & Co. ... ... —
Contraflo Condenser & Kinetic Air Pump Co. ... ... —
Coventry Chain Co., Ltd. 25
Crichton, C. & H., Ltd. ... ... —
Crichton, J., & Co., Ltd. 17

D

Delta Metal Co., Ltd. ... 1
Diamond, T., & Co. 25
Docker Bros., Ltd. ..
Doxford & Sons, Ltd. ... ...
Durham, Churchill & Co. ..

E

Edina Manufacturing Co. ..
Elder, Dempster & Co., Ltd. ... 23
Elkington & Co., Ltd. ... ... —
Elliot & Jeffery ... ...
Else, John, & Son, Ltd. ... ...

F

Field, Geo., & Co. ... ...
... ... —

G

Glamorgan Coal Co., Ltd. 18
Glasgow Patents Co., Ltd. ... ...
Glen Line, Ltd. 23
... ...
Goudie, James T., & Co. ... ... —
Graham, Alfred, & Co.... 10
Graphite Products, Ltd. ... ...
Gray, Wm., & Co., Ltd. ... ... —
Grayson, H. & C., Ltd. ... ...
Greenwood & Batley, Ltd. 14
Grieve, Thos., & Sons 17

H

Hall, J. & E., Ltd. ... ...
Hall, J. P., & Sons, Ltd. 3
Hamilton, Archibald H., & Co. ... 24
Hamilton, A., & Sons ... ...
Hamilton, Wm., & Co., Ltd. 16
Hannan & Buchanan ... ...
Harland & Wolff, Ltd.... 7
Harris Bros., Ltd. 24
Harrisons (London), Ltd. 1
Hastie, John, Ltd. ... ...
Hawthorne, R. & W., Leslie & Co., Ltd. 11
Heinke, C. E., & Co. 1
Higginson, T., & Co. 1
Hill's Dry Docks 23
Hingley, N., & Sons ... ...
Hogan & Wardrop 14
Holmes, J. H., & Co. ... ... —
Howden, J., & Co., Ltd. ... ...
Hudson, John, & Co.'s Successors ... 18

I

... ...

J

... ...

K

Kaye, Joseph, & Sons, Ltd. 18
Keith Blackman Co., Ltd., James ... 14
... ...

L

Lamport & Holt, Ltd. 23
Lawson Steam Tugboat Co., Ltd. ...
Laycock, W. S., Ltd. 12
... ...
Leitch, J., & Co. ... ...
Levick, John 1
Linkleter's Patent Ship Fittings Co. ... 25
Liverpool Patents Co., Ltd. 25
Liverpool Refrigeration Co., Ltd. ...
Livingstone & Cooper, Ltd. ... ...
Loveridge, Ltd. ... ...
Low, Archibald, & Sons, Ltd. ... 12

M

MacLaren Bros., Ltd. ... ... —
Mactaggart, Scott & Co., Ltd. ...
Marshall Patent Mattress Co., Ltd. ...
Martin, W. C., & Co. ... ... —
Mather & Platt, Ltd. 5
Maxwell, Ballard & Richardson, Ltd. —
McConwell, A., & Co., Ltd. ... ...
McGeoch, Wm., & Co., Ltd. ... ...
McNab Marine Appliances, Ltd. ... —
McRobie, John, & Sons ... ... —
Metallic Valve Co. ... ... —
Metrograph Co. ... ...
Milburn, A., & Co. ... ...
Mining Engineering Co., Ltd. ... 25
Mountstuart Dry Docks, Ltd. ... 25

N

Naval Colliery Co. (1897), Ltd. ... 18
Newall's Insulation Co., Ltd.... ... —
New Zealand Shipping Co., Ltd. ... 23
North Eastern Railway Docks ... —

P

P. & O. Steam Navigation Co. ... 23
Perman & Co., Ltd. 14
Peters, G. D., & Co., Ltd. ... ...
Piggott, Thos., & Co., Ltd. ... ...
Powell Duffryn Steam Coal Co., Ltd. ...

R

Ransomes & Rapier, Ltd. ... ...
Ray, J. W., & Co. ... ... —
Rennie & Co. ... ... —
Reyrolle, A., & Co., Ltd. ... ... —
Riley, Edward, & Co. 25
Rimer Bros. ... ... —
Robinson, A., & Co. ... ... —
Royal Mail Steam Packet Co., Ltd.... 23
Royal Merchant Seamen's Orphanage ...
Rowes, Ltd. ... ...

S

Safety Porthole Co., Ltd. ... ... —
... ... 24
... ...
Seamless Steel Boat Co., Ltd. ... —
Shearman, John, & Co., Ltd. ... —
... ...
... ...
Smith, John, & Son (Glasgow), Ltd. —
... ...
... ... 16
... ...
Stone, J. & Co., Ltd. ... ... —
... ...
... ...
Sunderland Forge & Engineering Co., Ltd. 1
Superheater Corporation, Ltd. ... —
Swain, J., & Son, Ltd.... ... ... —
Swan, Hunter & Wigham Richardson, Ltd. 9
Sykes, R., & Sons, Ltd. 3

T

... ...
Thornycroft, John I., & Co., Ltd. ... —
Tilbury Contracting & Dredging Co., Ltd. ... ...
Trewent, F. J., & Proctor, Ltd. ... —

U

United States Metallic Packing Co.... —

W

Wadkin & Co. 8
Walford, Leopold, & Co. 6
Walker, James, & Co., Ltd. 17
Walker, James (Glasgow) ... ... —
... ... 27
Wallsend Slipway & Eng'g., Co., Ltd. 13
... ...
Waygood-Otis, Ltd. ... ... —
... ...
Weir, G. & J., Ltd. 16
Welin Davit & Engineering Co., Ltd. —
Westinghouse Brake Co., Ltd. ...
White, J. Samuel, & Co., Ltd. ... 25
Whitfield's Safe and Door Co. ... —
Williams, Wm. ... ... —
Wilson, Hy., & Co. ... ... —
Workman, Clark & Co., Ltd. ... ... —
Wright, Joseph, & Co., Ltd. ... ... —

Y

Yarrow & Co., Ltd. 4
Yorkshire Copper Works, Ltd. ... 1

** Where no number is shewn against an Advertiser's name, the advertisement appears either in previous or subsequent issues.*
Classified Index to Advertisers will be found on pages 19, 20, 21 and 22.

Telegrams: "Cambria, Swansea." Telephone: No. 281 Central.

Engineers, Boiler Makers, Iron and Steamship Repairers.

Oxy-Acetylene Welding a Specialty.

HARRIS BROTHERS LIMITED

CAMBRIAN DRY DOCKS, SWANSEA.

(Situate between North, South & Prince of Wales Docks)

WARMING

MESSRS.

Saunders & Taylor, Ltd.

make a speciality of all kinds of warming installations, especially **"INVISIBLE" Warming** suitable for Residences and :: :: Ships' Cabins. :: ::

LIVERPOOL: 36, Dale Street. Tel.: 7371 Central.

MANCHESTER: 43, Lower Mosley St. Tel.: 4261 & 4262 Central.

"BITUFERRI"

FOR PAINTING

HOLDS, BULKHEADS, BUNKERS

Bituferri is Tenacious, Elastic, Withstands Sweating.

Bituferri is Anti-Corrosive, Durable, Economical, Safe to Use.

Sole Manufacturers:

ARCHD. H. HAMILTON & CO., Telegrams: "Satisfy." POSSILPARK, GLASGOW.

Compania Trasatlantica—Spain. MATAGORDA WORKS—CADIZ.

Graving Dock 500 feet long, 22 feet 9 ins. mean water on sill. Builders and Repairers of all classes of vessels, and of Railway carriages and wagons. Cardiff and Asturias coals supplied. Works provided with Tugs, Lighters, Divers, :: :: Salvage Pumps, etc. :: ::

APPLY TO:—

Delegacion de la Compañia Trasatlantica—Cadiz.

INSURE YOUR VESSELS AGAINST CORROSION

SPECIFY AND APPLY "BITUMASTIC" (BRAND) ENAMEL

TO BUNKERS, HOLDS, BALLAST TANKS, &c.

"BITUMASTIC" IS EXTENSIVELY USED BY THE ADMIRALTY, WAR OFFICE, H.M. BOARD OF WORKS, ALSO THE LEADING SHIPOWNERS THROUGHOUT THE WORLD.

WRITE FOR DESCRIPTIVE PAMPHLET (ILLUSTRATED) TO SOLE MANUFACTURERS:—

WAILES DOVE BITUMASTIC LTD., NEWCASTLE-ON-TYNE.

Also at LONDON, LIVERPOOL, GLASGOW, CARDIFF, HULL, &c.

TELEPHONES IN EVERY OFFICE. TELEGRAMS:—"BITUMASTIC."

COVENTRY NOISELESS CHAINS CANNOT SLIP That is one of many reasons why they prove so economical in Power Transmission

Handbook C3 on Chain Gearing FREE.

"The Coventry" Chain Co., Ltd. Coventry.

MOUNTSTUART DRY DOCKS, LTD.

CARDIFF.

MODERN MACHINERY FOR RAPID REPAIRS
PNEUMATIC PLANT 100 DRILLS

Dry Docks	440′ x 52′
	420′ x 52′
	550′ x 60′
Commercial	600′ x 60′

Telegrams: "Mountstuart." Telephones: 5103 (5 lines).

LARGEST DRY DOCKS IN THE BRISTOL CHANNEL.

BARRY GRAVING DOCK & ENGINEERING CO., LTD.

Best Facilities for Dispatch of Repairs of every description.

TELEGRAMS: "BARDOCK, BARRY." TELEPHONES { No. 290 BARRY (5 lines.) No. 7 BARRY (night calls.)

LIVERPOOL PATENTS CO., LTD.

PATENT "TRIDENT" FIREBARS

36,000 Furnaces already fitted.

Branches:—London, Glasgow, West Hartlepool.
Agencies: Cardiff, Sunderland, etc., and abroad.
Head Offices:—DERBY SQUARE, JAMES ST., LIVERPOOL.

THOS. DIAMOND & CO.,

Engineers, Boilermakers, General Ship Repairers and Boat Builders, CARDIFF.

Commercial Dry Dock, 600 feet x 60 feet.
OXY-ACETYLENE WELDING A SPECIALITY.

Telegrams: "Decks, Cardiff." Telephone: 4746 (Private Branch Exchange).

The "S. & S. R." is published every Thursday.

J. SAMUEL WHITE & COMPANY, LIMITED.

EAST COWES, I.W.

BUILDERS OF—

TORPEDO BOATS, T.B. DESTROYERS, SPECIAL SERVICE VESSELS, HARBOUR LAUNCHES FOR PILOT, POLICE WORK, &c.

"WHITE-FORSTER" WATER-TUBE BOILERS, WHITE-DIESEL MARINE OIL ENGINES, MARINE OIL-FUEL INSTALLATIONS.

FLAGS. BUY FROM FLAG MAKERS.
ON ADMIRALTY LIST.
FLAGS OF ALL NATIONS.

EDWARD RILEY & CO., LEEDS.

Telegrams "Flags, Leeds." Telephone 765.
Glasgow Branch—A. GRAY, 141, Bath Street.
Teleg. "Vulcan, Glasgow." Tel. 2442 Douglas.

DAWSON & DOWNIE,
CLYDEBANK.

PUMPS FOR MARINE INSTALLATIONS.

PATENT DIRECT-ACTING FEED & SERVICE PUMPS.
IMPROVED VERTICAL DUPLEX PUMPS.

BUOYANT DECK SEATS.

Approved by Board of Trade.

LINKLETER'S IMPROVED "C" TYPE.

May be instantly changed from Seat form into a BUOYANT APPARATUS OF STABILITY.

Sole Makers:—
Linkleter's Patent Ship Fittings Co., Hudson St., North Shields.

Meco Meco

Ship On Fire.

Meco

Smoke Helmet

is an apparatus for entering ships' holds in case of spontaneous combustion, for penetrating noxious fumes and for general fire fighting.

It consists of a best quality leather helmet with boxed crown and internal lacing which adapts it to any size or shape of head, 60 ft. of non-collapsible indiarubber hose pipe fitted with instantaneous couplings, pair of double-acting foot bellows, and strong leather waist belt. The whole encased in strong wooden box with rope handles.

WRITE IMMEDIATELY FOR ILLUSTRATED CATALOGUE.

The Mining Engineering CO., LTD.,

Telegrams: "Meco, Sheffield."
Telephone: Central 4530 (2 lines).

Meco Works, SHEFFIELD.

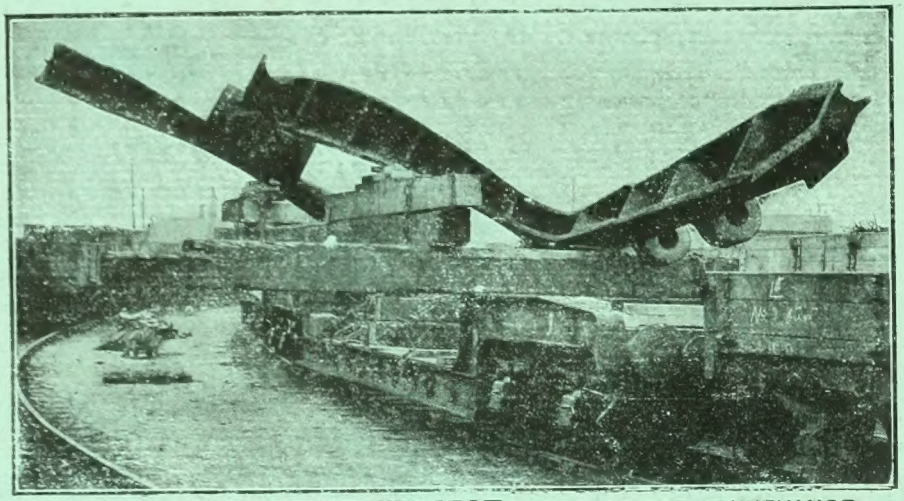
Meco Meco

DARLINGTON FORGE CO., LD.,

TELEPHONE: NOS. 9 & 10. DARLINGTON. TELEGRAMS: "FORGE," DARLINGTON.

STEEL CASTINGS
STEEL AND IRON FORGINGS

UP TO ANY WEIGHT.



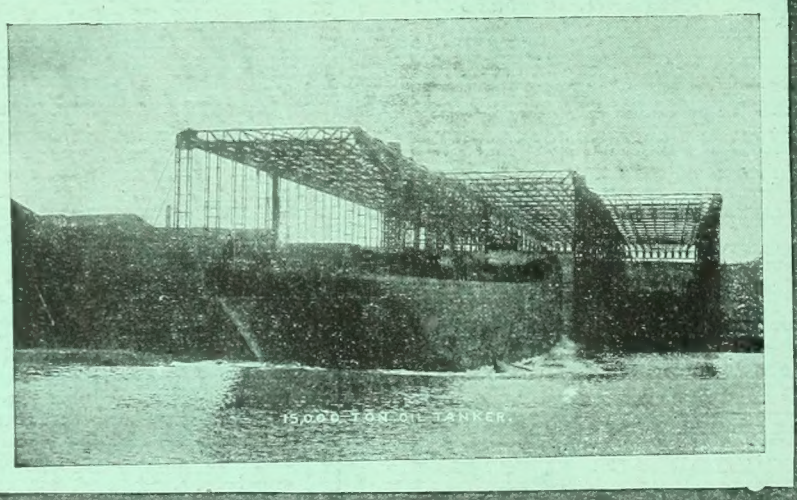
MILD STEEL STERNFRAME AS LOADED FOR CONVEYANCE FROM MAKER'S WORKS TO PORT OF SHIPMENT TO BUILDER'S YARD.

STERNFRAMES & RUDDERS

MADE INCLUDE THOSE FOR THE FOLLOWING SHIPS:—

"CARONIA"
"CARMANIA"
"MAURETANIA"
"LUSITANIA"
"CEVIC"
"OCEANIC"
"OLYMPIC"
"BRITANNIC"
"AQUITANIA"

DOXFORD & SONS LTD.,



SHIPBUILDERS AND ENGINEERS,
SUNDERLAND.

London: Printed by HARRISON & SONS, Printers in Ordinary to His Majesty, 45, 46 and 47, St. Martin's Lane, London, W.C., and published by the Proprietors of SHIPBUILDING AND SHIPPING RECORD, at Queen Anne's Chambers, Broadway, Westminster, London, S.W. *July* 8, 1915.